Courses that teach specifically on climate science and/or environmental sustainability

- **International Summer School on Sustainable Building**

Nineteen students from Spain, Italy, and Lithuania, two Polish students, and nine lecturers from foreign universities participated in the international summer school on the implementation of sustainable solutions in buildings. From 1 to 5 July 2024, the group engaged in on-site sessions at the Faculty of Civil Engineering and Environmental Sciences, Bialystok University of Technology, alongside specialists from the university and academics from partner institutions. The concept of sustainable buildings encompasses a range of activities, processes, and building practices that support the environment economically, socially, and environmentally. The construction industry is key in improving the quality of life, as it is estimated to account for about 40% of energy consumption, 30% of carbon dioxide emissions, and 40% of solid waste production. Researchers at the Faculty of Civil Engineering and Environmental Sciences, Bialystok University of Technology, have been deepening our knowledge in the field of passive construction for years and have made significant achievements. The desire to share their experience attracts young people who, during the Blended Intensive Programme funded under the Erasmus+ Programme, have the opportunity to learn about sustainable buildings from both the design and implementation perspectives—installing appropriate environmental engineering systems, integrating passive architecture into user-friendly spaces, and the financial aspects of the entire process. Besides attending lectures, laboratory sessions, and design exercises, participants of the summer school at Bialystok University of Technology toured Białystok and Podlasie. They had a study visit to the UNIHOUSE factory in Bielsk Podlaski, a pioneer in the Polish market for producing modern modular buildings with wooden frames. On Thursday afternoon, Marta Orpik and Izabela Karpińska (IROs) organised outdoor games for the students on the BUT campus, providing an excellent opportunity for integration and improving teamwork skills. All interested students could also participate in sports activities organised by Jolanta Zuzda, MD, PhD, Eng. The Blended Intensive Programme ” Effective Solutions for Sustainable Buildings” (ESSB) involved staff from the Faculty of Civil Engineering and Environmental Sciences: Assoc. Prof. Dorota Anna Krawczyk, DSc, PhD, Eng, Beata Biernacka, PhD, Eng, Dorota Gawryluk, PhD, Eng, Arch., Assoc Prof. Marta Kosior-Kazberuk, DSc, PhD, Eng, Beata Sadowska, PhD, Eng, Anna WernerJuszczuk, PhD, Eng, Tomasz Teleszewski, DSc, PhD, Eng, as well as lecturers from partner universities: University of Bologna (Italy), University of Florence (Italy), Universidad Politécnica de Madrid (Spain), University of Naples Federico II (Italy) and University of Cordoba (Spain). ***Students participating in the Summer School receive 3 ECTS credits***.

https://pb.edu.pl/en/2024/07/04/international-summer-school-on-sustainable-buildings/

- **International Summer School on Vernacular Architecture**

Vernacular architecture, rooted in local building traditions, was the main theme of the international summer school held at Bialystok University of Technology from 1 to 5 July 2024. This innovative offering is part of the Blended Intensive Programme under the Erasmus+ programme. It attracted 20 students and 6 lecturers from universities in Spain, Portugal, Italy,

Romania, and Lithuania. During the course dedicated to vernacular architecture — which is developed in a specific region based on factors such as the availability of building materials and climatic challenges — we focused on discussing the multi-generational tradition of wooden construction still alive in Podlasie. We introduced students from Spain, Portugal, Italy, Lithuania, and Romania to the characteristics of different areas of our region. This is an intriguing experience for them, as vernacular architecture in other parts of Europe is based on stone or brick constructions, – explains Dorota Gawryluk, PhD, Eng, Arch. from the Faculty of Civil and Environmental Engineering, the coordinator of the school.

We should pay particular attention to the advantages of vernacular architecture amid the current climate changes. It's worthwhile to draw from the traditions of our ancestors and share experiences with residents of various countries, regions, and climate zones. Importantly, in Podlasie, we have an excellent example of how vernacular architecture can inspire innovations in building. In this context, we discuss the production of modular houses at the Unihouse factory in Bielsk Podlaski. We look back to tradition to understand why wood was the optimal building material in our region and how it can be superbly used in contemporary architecture," adds Dorota Gawryluk, PhD, Eng, Arch.

Podlasie's vernacular architecture — wooden structures — has long been a focus of the research staff at the Faculty of Architecture of Bialystok University of Technology. Our knowledge in this area is expanded through studies of regional wooden building monuments and monographs on the role of wood as a building material. The Faculty also organizes the "Wood in Architecture" competition, promoting the best diploma projects nationwide, which feature wood prominently in their designs.

The immense potential of wooden architecture is evidenced by the success of the Polish Pavilion at EXPO 2020 in Dubai. Among its designers was Michał Czerwiński, MSc, Arch., a graduate of the Faculty of Architecture at Bialystok University of Technology and an architect at the renowned WXCA studio. The Polish showcase, entirely made of wood, won first place in the large pavilions category at the World Expo Awards organized by EXHIBITOR Magazine and was recognized by the Bureau International des Expositions in the "interior design" category. Once relocated to Poland, the Polish Pavilion, now known as Xylopolis Centre for Art and Science of Wood, has the potential to become a tourist attraction in Podlasie. ***Students participating in the Summer School receive 3 ECTS credits***

https://pb.edu.pl/en/2024/07/04/international-summer-school-on-vernacular-architecture/

O Students of Bialystok University of Technology who have completed studies in the following fields: • Electrical engineering - first-cycle studies with a general academic profile, • Eco-energy engineering - first-cycle studies with a general academic profile, may apply for a certificate as renewable energy installers based on their obtained education (without taking an exam).

Procedure for obtaining the certificate: The UDT certificate is a document confirming the installer's qualifications for the installation of one of the renewable energy systems listed below:

• Biomass boilers and furnaces,

• Photovoltaic systems,
• Solar heating systems,
• Heat pumps,
• Shallow geothermal systems.

Having this certificate has been a requirement for installers of renewable energy installations financed with public funds since January 1, 2016. For other installations, the certificate is an additional qualification and can enhance the credibility of individuals performing installations for micro and small systems.

- Bialystok University of Technology, as part of the SPINAKER program, organized the International Interdisciplinary Summer School titled *"ENERGY-EFFICIENT CONSTRUCTION FRIENDLY TO USERS AND THE ENVIRONMENT."* The project was carried out by staff from the Faculty of Civil Engineering and Environmental Sciences, the Faculty of Electrical Engineering, and the Faculty of Computer Science.

  The program covered topics related to sustainable development, and the proposed course was designed to ensure effective interdisciplinary cooperation in the process of creating an ecological home, in which the user can enjoy thermal comfort and savings. Topics discussed during the course included: Contemporary Architecture, Modern Materials Used in Construction, Energy-Efficient Heating and Ventilation Systems Enhancing User Comfort, Use of Ecological Sources of Thermal and Electrical Energy, Energy-Efficient Building Lighting, and Smart Buildings – Automation as a Means of Improving Functionality and Energy Savings. This international project of Bialystok University of Technology provided an opportunity to showcase our region as an area attractive in terms of architecture, culture, history, and nature, as well as a region implementing modern, environmentally friendly technologies in construction.

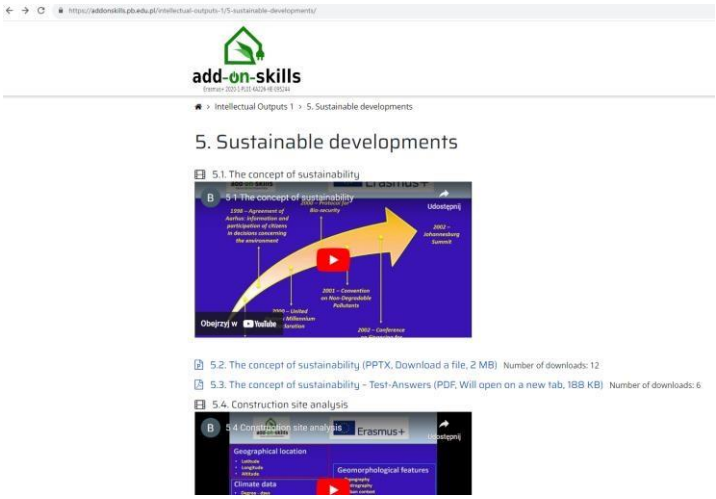
Students participating in the Summer School are awarded **5 ECTS credits**.

https://pb.edu.pl/iro/2022/02/21/join-our-summer-school-in-bialystok/
https://pb.edu.pl/bwm/projekty-nawa/spinaker/miedzynarodowainterdyscyplinarna-szkola-letnia/o-projekcie/

- Bialystok University of Technology, as part of the ADD ON SKILLS project, organized a Summer School. The classes focused on topics related to sustainable development, including: Green buildings and management of energy consumption, Sustainable developments, Modern low-energy buildings incorporating environmentally-friendly solutions, HVAC systems, and renewable energy sources.

Students participating in the Summer School are awarded **4 ECTS credits**.

https://addonskills.pb.edu.pl/intellectual-outputs-1/
https://addonskills.pb.edu.pl/summer-school/
https://addonskills.pb.edu.pl/intellectual-outputs-1/5-sustainable-developments/



- Bialystok University of Technology, as part of the project "GLOCAL – INNOVATIVE EDUCATION FOR FUTURE ENGINEERS RESPONDING TO THE CHALLENGES OF MODERN CITIES," organized Summer Schools for students and teachers. In 2022, two editions of the Summer School were held.

  The classes focused on issues related to sustainable development, which were later presented in project-related monographs, such as:

  - Photovoltaics and Contemporary Architecture in the Urban Landscape,
  - Systems Related to Sustainable Development,
  - Architecture and Design Theory in the Context of Sustainable Development of Modern Cities,
  - Structures and Building Materials,
  - Awareness of Sustainable Development in the Context of the Circular Economy,
  - Application of This Knowledge in Designing a Green Bus Shelter,
  - and other sustainability-related systems.

  As part of the project, scientific articles addressing topics related to sustainable development were also produced:

  Alejandra Vidales Barriguete, María Aurora Flórez de la Colina, Dorota Gawryluk, Dainora Jankauskienė, Pilar Cristina Izquierdo Gracia

"THE IMPORTANCE OF CREATING SUSTAINABLE CITIES"
https://glocal.pb.edu.pl/wp-content/uploads/2023/04/CITE-2021-Poster_Glocal.pdf
Dorota Anna Krawczyk, Ewa Szatyłowicz, Anna Justyna Werner-Juszczuk, Dorota Gawryluk
INNOVATIONS – SUSTAINABILITY – MODERNITY – OPENNESS MODERN SOLUTIONS IN ENGINEERING SERIES OF MONOGRAPHS, VOLUME 4, Białystok 2022, pp. 77-87
https://pb.edu.pl/oficyna-wydawnicza/wp-content/uploads/sites/4/2023/01/ISMO44.pdf
Students participating in the Summer School are awarded **6 ECTS credits**.
https://glocal.pb.edu.pl/

- **Subjects related to sustainable development at Bialystok University of Technology in the academic year 2023/2024**

Lp	Name of Department	Name of the direction	Type of course (Eng., Lic., M.Sc., Doctoral School)	Name of the subject related to sustainable development in the academic year 2023/2024	Content
1.	Faculty of Building and Environmental Sciences	Landscape Architecture	Eng.	Land reclamation	Ways of preventing soil degradation and methods of restoration.
2.	Faculty of Building and Environmental Sciences	Landscape Architecture	Eng.	Economics and management in landscape architecture	Principles of management of nature conservation forms.
3.	Faculty of Building and Environmental Sciences	Landscape Architecture	Eng.	Green roofs and green walls	Sustainability. Green roofs as part of sustainable drainage systems in urban areas.

4.	Faculty of Building and Environmental Sciences	Landscape Architecture	Eng.	Natural basis of landscape design	The structure of the Earth. Endogenous and exogenous processes shaping the Earth's surface. The dependence of relief on geological structure. Water in the environment. Water resources. Catchment area. River systems. Lakes. Wetlands. Measurements in hydrology. Water balance. Groundwater. Climate.
5.	Faculty of Building and Environmental Sciences	Biotechnology	Eng.	Sustainability civilisation risks	Laws governing sustainable development and its environmental, economic and social aspects. Historical conditions of sustainable development and its indicators.

					Fundamentals of state environmental policy.
6.	Faculty of Building and Environmental Sciences	Biotechnology	Eng.	Bioremediation of contaminated sites	Land remediation, with particular emphasis on bioremediation.
7.	Faculty of Building and Environmental Sciences	Biotechnology	Eng.	Biofuel production technologies	Environmental and economic aspects of biofuel use.
8.	Faculty of Building and Environmental Sciences	Biotechnology	Eng.	Microbiological waste treatment methods	Biotechnology for a closed loop waste management.

9.	Faculty of Building and Environmental Sciences	Biotechnology	Eng.	Biological waste gas treatment	Air pollutants, sources, environmental and human impacts. Presentation and detailed discussion of sources of atmospheric gaseous pollutants and methods of reducing and removing these pollutants from waste gases.
10.	Faculty of Building and Environmental Sciences	Biotechnology	MA	Water conservation engineering	Familiarisation with engineering methods of water conservation. To familiarise you with how to assess the impact of selected facilities on water quality.
11.	Faculty of Building and Environmental Sciences	Construction	Eng	Special concretes and recycling of concrete structures	Technology and recycling methods for reinforced concrete structures. Technology for the production of concrete structures from recycled materials.
12.	Faculty of Building and Environmental Sciences	Construction	Eng	Low-energy construction and energy efficiency in buildings	Evaluation of the energy, economic and environmental efficiency of retrofit measures that reduce energy consumption.
13.	Faculty of Building and Environmental Sciences	Construction	MA	Modern technology	Ecological material solutions used in building structures.
14.	Faculty of Building and Environmental Sciences	Construction	MA	Building thermal diagnosis and thermo-modernisation	Thermomodernisation - principles for planning and carrying out investments. Economic efficiency of heat sources. Possibilities of subsidising thermomodernisation investments and their economic efficiency.

15.	Faculty of Building and Environmental Sciences	BIM	MA	Building operations in BIM terms	Building life cycle including BIM and FM (Facility Management) techniques. BLM (Building Lifecycle Management). Concepts of sustainability of a building and its components, building wear and tear.
16.	Faculty of Building and Environmental Sciences	BIM	MA	Sustainable construction using BIM	Principles of building design and technical equipment in a sustainable development strategy. Building installations in sustainable construction.
17.	Faculty of Building and Environmental Sciences	Civil Engineering	Eng	Special concretes and recycling of concrete structures	Demolition and reaycling of used concrete structures; Recycled aggregate; Recycled aggregate concrete
18.	Faculty of Building and Environmental Sciences	Civil Engineering	Eng	Low energy buildings and rational use of energy in buildings	Evaluation of the energy, economic and environmental efficiency of retrofit treatments that reduce energy consumption.
19.	Faculty of Building and Environmental Sciences	Thermal power generation	Eng.	National environmental policy	State environmental policy in the national development management system. Sustainable management of environmental resources.

20.	Faculty of Building and Environmental Sciences	Thermal power generation	Eng.	Sustainable development and risks to civilisation	Basics of sustainable development (origins, concepts, terms, essence). Stages of implementation of sustainable development. Principles and laws of sustainable development. Sustainable development indicators according to OECD / UNEP and the World Bank.

21.	Faculty of Building and Environmental Sciences	Environmental Engineering	Eng.	National ecological policy	State Environmental Policy - objectives and tasks of a systemic nature. Integration of environmental aspects into sectoral policies, activation of the market for environmental activities, protection of the natural heritage and rational use of natural resources.
22.	Faculty of Building and Environmental Sciences	Environmental Engineering	Eng.	Techniques for environmental reclamation	Basic concepts of environmental remediation. Threats, degradation, devastation and transformation of land and water. Degradation and remediation of soils and waters.
23.	Faculty of Building and Environmental Sciences	Environmental Engineering	Eng.	Sustainable development and civilization threats	The basics of sustainable development. Earth Summit 1992 (Rio Declaration, Agenda 21, Convention on Climate change, Convention on Biological Diversity, Declaration on the principles of forest management). Principles and laws of sustainable development. Sustainable development indicators. Global and local causes of civilization threats (demographic growth,

					development of technology, development of world agriculture, natural hazards to human health).

24.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Economic determinants of tourism development	Legal, social, economic and natural and cultural determinants of tourism development.
25.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Economics of cities and regions	Regional development programmes.
26.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Municipal development strategies	Comprehensive planning for sustainable municipal development
27.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Natural determinants of land management	Assessment of the influence of the natural environment on spatial development directions and prediction of the impact of spatial development on changes in the natural environment
28.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Basics of spatial planning	Sustainability and environmental protection as an important element of land use policy
29.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Sustainability audit	Sustainability audit in local development management.
30.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Landscape valorisation	Environmental and landscape valorisation and assessment
31.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Valorisation of the natural environment	Methods for valuing the natural environment
32.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Environmental effects of LSDP implementation	Procedures for integrating environmental concerns into the land-use planning process

33.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Environmental Impact Assessments	Procedures for integrating environmental concerns into the investment process.
34.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Rural development	Natural basis for the location of rural settlements
35.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Revitalisation of urban areas	Economic and social aspects of revitalisation.Sustainable urban development. Natural revitalisation. Revitalisation of postindustrial areas and housing estates. Revitalisation of suburban landscapes.
36.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Fundamentals of environmental protection	Environment - basic concepts. System of environmental law in Poland. Biotic elements and abiotic elements - concepts, structure and functioning. Inventory and valorisation of the natural environment. Protection of biotic and abiotic elements of the environment.
37.	Faculty of Building and Environmental Sciences	Spatial management	Eng.	Use of local natural resources	Local resources and their classification. Local resources as a factor in the development of the area. Natural environment. Sustainable development. Natural revitalisation.
38.	Faculty of Building and Environmental Sciences	Spatial management	MA	Environmental management system	EN ISO 14001 Model: PlanDo-Check-Act. Methods for identifying environmental aspects and methods for selecting significant

					environmental aspects. Introduction to EMAS (EcoManagement and Audit Scheme). Comparative analysis of EMAS with ISO 14001. Costs and benefits of implementation.
39.	Faculty of Building and Environmental Sciences	Spatial management	MA	Environmental management and economics	Legal, economic and administrative instruments in environmental management. Costs of using and protecting the environment - capital expenditure and running costs. Effects of the implementation of projects in environmental protection. Methods of assessing the effectiveness of conservation projects. Financing of environmental protection activities. Methods of valuing the environment.
40.	Faculty of Building and Environmental Sciences	Spatial management	MA	Fundamentals of building thermal diagnostics	Programmes to reduce energy consumption. Heat exchange of the building with the environment. Contribution of individual factors to the heat balance of a building.
41.	Faculty of Building and Environmental Sciences	Spatial management	MA	Energy and environmental efficiency of thermal upgrading	Methods for assessing the energy and economic efficiency of thermomodernisation projects. Profitability analysis of thermomodernisation undertakings. Assessment of the ecological effects associated with thermomodernisation.

42.	Faculty of Building and	Spatial management	MA	Open space planning	Discussion of the solution of planning problems in areas endangered by
	Environmental Sciences				natural factors, in areas under legal protection, the shaping of development depending on the limiting factors present. Indication of legal and environmental conditions of selected cases in spatial planning.
43.	Faculty of Building and Environmental Sciences	Spatial management	MA	Landscaping of agricultural and forestry land	Legal, economic and proxemic issues of agricultural and forest land scale and exchange. The agricultural-forest boundary as an effect of the implementation of the local plan. Economic, ecological and landscape dimensions of the implementation of afforestation of marginal land.
44.	Faculty of Building and Environmental Sciences	Agricultural and Food Engineering	Eng.	Biofuel production	Characteristics of the main types of plant biomass. Quality assessment of biofuels.
45.	Faculty of Building and Environmental Sciences	Agricultural and Food Engineering	Eng.	Energy use of biomass	Legal conditions for the use of biomass in the energy sector. Environmental impact.

46.	Faculty of Building and Environmental Sciences	Agricultural and Food Engineering	Eng.	Environmental ecology	To familiarise students with the basic concepts: environmental ecology and its elements, pollution, natural resources, and the issues of degradation and protection of the lithosphere, hydrosphere and atmosphere. Causes, effects and basic methods of environmental pollution prevention.
47.	Faculty of Building and Environmental Sciences	Agricultural and Food Engineering	Eng.	Waste disposal	Directions necessary for the proper functioning of the agro-food industry waste management system taking into account the legal requirements for environmental protection. Basic issues of waste management, methods and ways of waste disposal. Waste management in Poland in relation to state strategy and policy.
48.	Faculty of Building and Environmental Sciences	Agricultural and Food Engineering	Eng	Environmental protection in agriculture	Threats to the environment from agricultural activities: fertilisation, plant protection, animal production, and agri-food processing. Pro-ecological production directions in agriculture. Introduction to environmental protection law. Environmental protection in the investment process. Liability for environmental damage. Public participation in environmental protection procedures.

49.	Faculty of Building and Environmental Sciences	Agricultural, Food and Forestry Engineering	MA	Ecological engineering in agricultural production	Modern technologies in agricultural production and their impact on the environment. The ability to prepare action plans to reduce the negative impact of agriculture on the environment. Code of Good Agricultural Practice. Organic farming.
50.	Faculty of Building and Environmental Sciences	Agricultural, Food and Forestry Engineering	MA	Alternative energy sources	Organisational issues in alternative energy sources, energy clusters, energy micro-regions. Methods for assessing the energy efficiency of alternative energy sources in food processing and agriculture.

51.	Faculty of Building and Environmental Sciences	Agricultural, Food and Forestry Engineering	MA	Precision agriculture and forestry	Organic precision agriculture.
52.	Faculty of Building and Environmental Sciences	Agricultural, Food and Forestry Engineering	MA	Agricultural and forestry systems	Sustainable system: ecological and economic objectives, role of crop rotation, conservation tillage, optimal fertilisation, crop protection based on damage thresholds. Sustainable production of agricultural crops. Sustainable production in grassland. Integrated horticultural production. The role of the state in implementing an integrated system. Economic indicators of management in different systems.

53.	Faculty of Building and Environmental Sciences	Agricultural, Food and Forestry Engineering	MA	EU rural projects	Impact of the common agricultural policy and cohesion policy on rural development. Funds and programmes supporting cohesion policy. EU and Polish regulations implementing the Common Agricultural Policy. Support instruments of the Rural Development Programme. Principles of financing and type of support for farms and entrepreneurship in rural areas.
54.	Faculty of Building and Environmental Sciences	Agricultural, Food and Forestry Engineering	MA	Ethics in the management of natural resources	Principles of the management of resources and components of animate and inanimate nature in terms of their sustainable use. To teach the administrative procedures for obtaining the legally required permits and decisions in nature resources management. To familiarise students with the basic legal acts regulating the management of environmental resources.
55.	Faculty of Building and Environmental Sciences	Environmental Engineering	Eng.	Water management and protection	Water resources and water management in Poland and EU countries.

56.	Faculty of Building and Environmental Sciences	Environmental Engineering	Eng.	National environmental policy	State Environmental Policy - objectives and tasks of a systemic nature. Integration of ecological aspects into sectoral policies, activation of the market for environmental activities, protection of natural heritage and rational use of natural resources.
57.	Faculty of Building and Environmental Sciences	Environmental Engineering	Eng.	Sustainable development and risks to civilisation	Basics of sustainable development (origins, concepts, terms and essence). Principles and laws of sustainable development. Indicators of sustainable development.
58.	Faculty of Building and Environmental Sciences	Environmental Engineering	Eng.	Waste management	Formal and legal basis of waste management in Poland and the EU. Principles of waste management.
59.	Faculty of Building and Environmental Sciences	Environmental Engineering	Eng.	Environmental remediation techniques	Basic concepts of environmental remediation. Threats, degradation, devastation and transformation of land and water. Degradation and remediation of soils and waters.
60.	Faculty of Building and Environmental Sciences	Environmental Engineering	Eng.	Environmental impact assessment	Environmental impact assessment procedures. Legal principles of environmental protection versus environmental impact assessments. Origins and nature of environmental impact assessment proceedings.

61.	Faculty of Building and Environmental Sciences	Environmental Engineering	MA	Environmental monitoring	Legal and economic aspects of environmental protection. Environmental management systems. Assessment and management of risks of environmental hazards.
62.	Faculty of Building and Environmental Sciences	Environmental Engineering	MA	Water and wastewater management in industrial plants	Legal norms and tasks related to water and wastewater management in industrial plants.
63.	Faculty of Building and Environmental Sciences	Environmental Engineering	MA	Environmental management	National environmental policy, pro-environmental management of the territorial unit and enterprise. Instruments of environmental impact analysis in territorial units and enterprises, environmental management systems - characteristics and requirements.
64.	Faculty of Building and Environmental Sciences	Environmental Engineering	MA	Economics of water supply and water conservation	Water resources and their use. Environmental and resource costs. Water conservation policy and its instruments.
65.	Faculty of Building and Environmental Sciences	Environmental Engineering	MA	Rationalisation of heat consumption	Legislation on heat efficiency.
66.	Faculty of Building and Environmental Sciences	Environmental Engineering	MA	Alternative energy sources	Legislation on alternative energy sources.

67.	Faculty of Building and Environmental Sciences	Environmental Engineering	MA	Air protection and flue gas cleaning	Legal norms in the protection of the atmosphere. International conventions and protocols limiting emissions. Distribution and transformation of pollutants in the atmosphere. Mechanisms of environmental impact of selected air pollutants. Energetics of the atmosphere.
68.	Faculty of Building and Environmental Sciences	Environmental Engineering	MA	Disposal of water and sewage sludge	Discussion of the basic technological processes of sludge treatment used in wastewater treatment plants. Presentation of legal aspects in relation to Polish, US and EU law. Analysis of the existing state of sludge management in a selected European country and in Poland and the Podlaskie Voivodeship. Ways of final disposal of sludge. Sewage sludge management plans. Discussion of issues related to sludge management arising during water treatment.
69.	Faculty of Building and Environmental Sciences	Forestry	Eng.	Eco-philosophy	Specificity of ecophilosophy - ecological science and ecology, Polish sozology and various philosophies of environmental protection.

70.	Faculty of Building and Environmental Sciences	Forestry	Eng.	Environmental ethics	Main currents of environmental ethics. Relationships between man and the biosphere in the light of different paradigms, worldviews, cultural traditions: anthropocentrism, biocentrism, ecocentrism, holistic approach, Christian
					philosophy of nature. Systems for assessing the value of nature.
71.	Faculty of Building and Environmental Sciences	Forestry	Eng.	Reclamation of forest areas	Principles and guidelines for the design of reclamation and development.
72.	Faculty of Building and Environmental Sciences	Forestry	Eng.	Shaping the forest environment	Sustainable forest management
73.	Faculty of Building and Environmental Sciences	Forestry	Eng.	Environmental management	Environmental management in the light of the concepts of sustainable and balanced development.
74.	Faculty of Building and Environmental Sciences	Forestry	Eng.	Nature and forestry education	Different methods of nature and forestry education, with particular emphasis on active education methods
75.	Faculty of Building and Environmental Sciences	Forestry	Eng.	Forest tourism management	Contemporary trends in tourist management of forests. Economic conditions for the operation of tourism and recreation in State Forests and National Parks.

76.	Faculty of Building and Environmental Sciences	Forestry	Eng.	Threats to civilisation	he nature and civilisation hazards in the context of nature conservation. Climate change caused by human activity and its prevention.
77.	Faculty of Building and Environmental Sciences	Forestry	Eng.	Renewable energy sources	Investment feasibility and profitability analysis and studies. Environmental analysis.
78.	Faculty of Building and Environmental Sciences	Forestry	MA	Contemporary trends in forestry	Modern silvicultural and forest management technological systems

79.	Faculty of Building and Environmental Sciences	Forestry	MA	Forest education for sustainable development	Sustainable development measures for forest education
80.	Faculty of Building and Environmental Sciences	Forestry	MA	Social conflicts in nature conservation	Principles of nature conservation legislation. Opportunities related to legislation on social conflicts in nature conservation.
81.	Faculty of Management Engineering	tourism and recreation	licence.	Protection of the natural environment	Essence of sustainable development, documents and commitments (in particular relating to the environment), environmental protection as an objective of the EU's sustainable development strategy, monitoring of the implementation of sustainable development by order (mainly environmental), by area and by objective - system of sustainable development indicators.

82.	Faculty of Management Engineering	tourism and recreation	licence.	Financing of tourism activities	The tourism enterprise and the Sustainable Development Goals.
83.	Faculty of Management Engineering	tourism and recreation	licence.	Corporate social responsibility	The concept of sustainable development as an element of corporate social responsibility. Selected types of environmental certifications (ISO 14001, EMAS standards). Good practices in the implementation of sustainable development with selected examples from the tourism industry.
84.	Faculty of Management Engineering	tourism and recreation	licence.	EU tourism policy	Sustainability in EU tourism policy (analysis in terms of the challenge and the integration of the problem in EU tourism orientations).

					Discussing EU policy documents such as: "Agenda for a sustainable and competitive European tourism", "Europe 2020 - Strategy for smart, sustainable and inclusive growth", "Europe - the world's most popular tourist destination - a new policy framework for the European tourism sector" (priority objectives refer to sustainability and sustainable tourism). Analysis of specific EU actions and initiatives for sustainable tourism development.
85.	Faculty of Management Engineering	tourism and recreation	licence.	Economics of tourism and recreation	Economic, social and environmental effects of tourism and recreation development at international, national, regional and local scales.

86.	Faculty of Management Engineering	management, 1 st.	licence.	Closed loop economy	Sustainable production and consumption, waste management, bioeconomy. GOZ activities in different economic sectors, including eco-design, recycling and recovery, reuse.
87.	Faculty of Management Engineering	management, 1 st.	licence.	Environmental management	State environmental policy. Legal and administrative instruments of policy implementation. Economic instruments of environmental protection. Authorities and institutions of environmental protection in Poland. Sources of information about the environment: environmental monitoring, CSO reporting. Methods of valuing environmental goods. Losses caused by pollution and degradation of the environment. Environmental impact assessments. Sources of funding for environmental protection in Poland. Trading in emission permits.
88.	Faculty of Management Engineering	management, 1 st.	licence.	Integrated management systems	Environmental management system according to the requirements of the ISO 14000 series of standards.
89.	Faculty of Management Engineering	management, 2 st.	MA	Ethics in management and CSR	The concept of corporate social responsibility. Examples of voluntary social responsibility initiatives and tools, social responsibility guidelines, reporting of socially responsible activities.

90.	Faculty of Management Engineering	management, 2 st.	MA	Green economy	Sustainability as the basis of the green economy. The concept, objectives and principles of the green economy. Green economy in international, EU and Polish environmental policy. Main areas of green economy: sustainable energy and renewable energy sources, waste recycling, sustainable production and consumption, sustainable transport, sustainable agriculture. Green economy indicators. Financing of green economy activities.
91.	Faculty of Management Engineering	management, 2 st.	MA	Low-emission economy	Links between sustainable development, the green economy and the low carbon economy. The problem of climate change as a cause of low-carbon economy development. Low-carbon economy in international, EU and Polish environmental policy. Renewable energy sources and energy efficiency in various sectors of the economy. Financing lowemission economy measures.
92.	Faculty of Management Engineering	logistics, 1 st.	Eng.	Environmentalism	Waste management, waste prevention, waste recycling, waste disposal in accordance with environmental requirements.

93.	Faculty of Management Engineering	logistics, 1 st.	Eng.	Sustainable development	The rationale for sustainable development. Foundations of a systemic view of problems of the modern world. History of the concept of sustainable development. Definition, objectives and principles of sustainable development. Tools for implementation sustainable development. Social and environmental aspects of sustainable Development. Sustainable development indicators. Assessment of the implementation of the principles sustainable development in Poland and worldwide.
94.	Faculty of Management Engineering	logistics, 1 st.	Eng.	Commodities	The environmental impact of overproduction.
95.	Faculty of Management Engineering	production management and engineering, 1 st.	Eng.	Ecology of natural resources and environmental protection	Relationships between the environment and the economy. The environment as an object of use and protection: basic terms and problems. A systemic approach to environmental

					issues. The problem of the limitation of natural resources. Economic activity and the functioning of ecosystems. The essence, features and causes of the contemporary environmental crisis. The state of the global environment. Motives and concepts of environmental protection. Main directions of counteracting the ecological crisis (economics, politics, technology).
96.	Faculty of Management Engineering	production management and engineering, 1 st.	Eng.	Technology basics	Energy efficiency. Consideration of environmental values in the use of specific technological solutions in business operations.
97.	Faculty of Management Engineering	production management and engineering, 1 st.	Eng.	Environmental management	State environmental policy. Instruments for the implementation of environmental policy. Institutions and organisations in environmental protection. Sources of information on the environment. Valuation of environmental goods. Losses caused by pollution and degradation of the environment.

98.	Faculty of Management Engineering	production management and engineering, 1 st.	Eng.	Industrial site management	Planning of industrial activities - environmental impact assessments of projects. Monitoring of the impact of industrial activities on the anthroposphere and the natural environment. Greenery on industrial sites. Degraded areas: legal basis, classification, qualification systems for
					restoring degraded land to socio-economic circulation. Revitalisation of postindustrial areas.

99.	Faculty of Management Engineering	production management and engineering, 1 st.	Eng.	Technologies for producing energy from renewable sources	Threats from the use of fossil fuels: depletion - oil peak problem and similar, global warming possible causes and attempts to reduce the impact. Hydrogen as a motor fuel. Use of solar energy. Conversion to thermal energy - low power solar collectors (distributed sources), high power high temperature collectors. Photovoltaic converters. Biomass utilisation. Types of biomass: organic waste (plant and animal origin), purpose-grown plants. Biomass conversion technologies: direct combustion, gasification, gasification with chemical synthesis, fermentation, other biotechnological methods. Types of biomassderived fuels: solid fuels with different conversion rates, liquid fuels, gaseous fuels. Wind energy, water fall, tidal energy. Geothermal sources
100.	Faculty of Management Engineering	production management and engineering, 2 st.	MA	Closed loop economy	Sustainable production and consumption, waste management, bioeconomy. GOZ activities in different economic sectors, including eco-design, recycling and recovery, reuse.
101.	Faculty of Information Technology	Informatics	Eng.	Algorithms and data structures	Design and implementation of efficient algorithms (dynamic and greedy programming techniques)

					for solving combinatorial optimisation problems.

102.	Faculty of Information Technology	Informatics	Eng.	Software engineering	Software quality assurance and software metrics; documentation, installation, implementation and maintenance of software; reliability of information systems; software project management; project risk management.
103.	Faculty of Information Technology	Informatics	Eng.	Operating systems	Protection and security
104.	Faculty of Information Technology	Informatics	Eng.	Wireless networks	Security in wireless networks
105.	Faculty of Information Technology	Informatics	Eng.	Team project 1	To prepare students to participate in complex IT projects. Students will acquire the ability to prepare a project, based on an interview with a client, also without basic IT knowledge, and to manage and actively participate in IT projects carried out in teams.
106.	Faculty of Information Technology	Informatics	Eng.	Security of computer networks	Methods for securing computer systems and networks and testing them for security. Cryptographic methods to ensure the confidentiality and trustworthiness of digital data.
107.	Faculty of Information Technology	Computer Science (specialisation: Software Engineering; Intelligent	MA	Internet of things	The Internet of Things concept. Applied IoT platforms and environments. Standards. Testing and self-testing. Wired interfaces. Wireless

		Internet Systems)			interfaces. Low power design.
108.	Faculty of Information Technology	Computer Science (specialisation: Software Engineering; Intelligent Internet Systems)	MA	IT project management	The importance of certification and ethics and showcasing the development of project management software.
109.	Faculty of Information Technology	Computer Science (specialisation: Software Engineering; Intelligent Internet Systems)	MA	Selected distributed systems	Information storage in distributed systems: distributed file systems, databases. Security in distributed systems.
110.	Faculty of Information Technology	Computer Science (specialisation: Intelligent Internet Systems)	MA	Administration of LAN networks	Theoretical foundations of remote network management protocols. Security of local networks. Ensuring the confidentiality of transmitted data.
111.	Faculty of Information Technology	Computer Science (specialisation: Intelligent Internet Systems)	MA	Techniques for ensuring confidentiality on the Internet	Symmetric cryptography. Asymmetric cryptography. Hash functions. RSA. Digital signature. Quantum cryptography. Physical cryptography. E-commerce security standards. SET protocol.
112.	Faculty of Information Technology	Computer Science (specialisation: Intelligent Internet Systems)	MA	Advanced Internet of Things	Computing system parameters key to IoT systems. Security of IoT systems. IoT design support systems. The concept of IoE.

113.	Faculty of Information Technology	Computer Science (specialisation: Intelligent Internet Systems)	MA	Cyber security	Cyber threats. APT issues. Legal issues related to cyber crime. Development of secure software. The use of advanced cryptographic methods in the design and
					implementation of modern techniques for securing computer systems. Security of the internet of things.
114.	Faculty of Information Technology	Computer science and econometrics	Eng.	Macroeconomics	Interest rates: financial market equilibrium, money supply controls. Monetary and fiscal policy: monetary policy rules, IS-LM model, nature of stabilisation policy. Inflation and unemployment: inflation, unemployment and output, methods of combating inflation, labour market, analysis of unemployment, costs of unemployment.
115.	Faculty of Information Technology	Computer science and econometrics	Eng	Microeconomics	Economic regularities at the scale of individual economic agents and individual markets and the principles of the country's economy and its components, together with the interpretation of basic economic measures and indicators. Labour market equilibrium, productivity differences.

116.	Faculty of Information Technology	Computer science and econometrics	Eng	Algorithms and data structures	Designing computationally efficient algorithms and data structures, evaluating the effectiveness of the solutions used, identifying computationally difficult problems and applying approximate solutions to these problems.
117.	Faculty of Information Technology	Informatics and econimetrics	Eng	Software engineering	Documentation, installation, implementation and maintenance of software; reliability of information systems; software project management; project risk management.
118.	Faculty of Information Technology	Computer science and econometrics	Eng.	Operating systems	Elements of computer architecture. Processes and threads. Concurrency. Basic synchronisation problems. Semaphores and Monitors. Jamming and starvation. Processor and disk scheduling. Operational memory management and virtual memory. Protection and security. File systems. Systems for parallel, distributed machines. Realtime and multimedia systems.

119.	Faculty of Information Technology	Applied mathematics	Eng.	Algorithms and data structures	Evaluating the efficiency of an algorithm and designing efficient solutions even before the implementation phase of the algorithm. The student will be equipped in the lecture with knowledge of: methods for determining/estimating the time cost of algorithmic solutions, methods for designing efficient algorithmic solutions, methods for designing efficient data structures, computationally difficult problems and approximate solutions.
120.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Information technology (ES1F1003)	To learn about legal and ethical issues related to the use of computer technology. To learn about the principles of work safety, ergonomics and cyber security in working with computers.

121.	Faculty of Electrical Engineering	Electrical engineering	Eng.	New trends in AEiE technologies (ES1F1008)	Presentation in relation to the field of automation, electronics and electrical engineering: state of the art, opportunities for innovative technology development, national and international market potential, innovative companies and start-ups. Energy transition and new energy networks: reasons, directions, assessment of staffing needs.

122.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Materials Engineering (ES1F2015)	Modern materials used in electrotechnical structures and systems. Presentation of the current state of development and research in the field of materials engineering in electrical engineering, including lighting technology.
123.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Pro-social aspects of the engineer's work (ES1F3902)	Basic principles of universal design in terms of the design, construction and operation of technical installations. Examples of good engineering practice in the adaptation of public spaces for persons with reduced functionality with particular attention to the specificity of solutions associated with equipment and installations Faculty of Electrical Engineeringmi.
124.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Electric drive automation 1 (ES1E6115)	To provide students with knowledge of modern trends in automatic drive system technology and the possibilities of using modern specialised microelectronic systems.

125.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Renewable Energy Systems 1 (ES1E6209)	Environmental, energy efficiency and RES legislation and regulations. Basic technologies for the use of renewable energy. Basic technologies for the use of renewable energy resources.
126.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Intelligent electrical installations (ES1E6210)	Education of knowledge of energy efficiency of Faculty of Electrical Engineeringch installations equipped with automation and control.

127.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Power generation and electricity management (ES1E6213)	To familiarise students with the methods of electricity generation, to teach them to understand the energy conversion processes in power plants, and to apply methods for evaluating investments in the electric power industry
128.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Illumination and lighting techniques (ES1E6215)	Normative requirements for indoor and outdoor lighting. Light pollution and photobiological safety.
129.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Renewable Energy Systems 2 (ES1E7218)	To familiarise students with the basic technologies of renewable energy sources. To teach the principles of selection and calculation of RES resources and energy yield in RES systems.
130.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Modern light sources (ES1E7220)	To familiarise students with selected metrology problems arising from the use of semiconductor sources.
131.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Economics (ES1E7951)	Sustainable development. Principles of sustainable development in energy. Indicators of sustainable development.

132.	Faculty of Electrical Engineering	Electrical engineering	MA.	Selected topics in lighting technology 1 (ES2E100007)	Photobiological safety of light sources. Light pollution.

133.	Faculty of Electrical Engineering	Electrical engineering	MA.	Selected topics in electrical history (ES2E200 121)	Key developments in the development of electrical engineering and their significance for the development of technology, industry and society . The development of the electrical engineering industry.
134.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Basics of energy-efficient construction (EKS1C1802)	Heat balance and energy demand of a building, principles of heat balance design in the context of energy efficiency in a building.
135.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Economics of investment in eco-energy (EKS1C1802)	Legal environment for investing in renewable energy sources. Governance of the energy sector in Poland. Legal and economic constraints on the location of RES.
136.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Investing in renewable energy sources in the light of Polish energy policy (EKS1C1803)	Polish energy policy, objectives and means of implementation. Governance of the energy sector in Poland.
137.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Renewable energy sources (EKS1C2013)	Methods of estimating renewable energy resources. Effects of meteorological conditions on the operation of renewable energy resources.
138.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Methods of electricity generation (EKS1C3021)	The role of different types of power plants in the electricity system. Development trends of fossil fuel power plants.

139.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Fundamentals of Electrical Networks (EKS1C3022)	Impact of electric power transmission systems on the human body and the environment.
140.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Biofuel production technologies (EKS1C4024)	Familiarisation with issues relating to the environmental effects of biofuel use.
141.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Fuels and combustion (EKS1C4029)	Characteristics of solid, liquid and gaseous fuel combustion. Emissions of pollutants and methods to reduce them.
142.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Environmental protection in the energy industry (EKS1C4030)	Types of pollution produced by different energy sources. Impact of pollutants on human health and plants.
143.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Polygeneration systems (EKS1C5201)	Use of renewable and nonconventional energy sources for cogeneration. Issues of assessing energy, environmental and economic efficiency in cogeneration.
144.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Micro power plants (EKS1C6051)	Cooperation of the microgrid with the heat and cold distribution network. Co-operation of microgrids with the electricity grid. Issues of energy, economic and environmental efficiency of microgrids.
145.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Materials engineering (EKS1C6106)	Research and development directions for diagnostics of modern engineering materials.

146.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Legal and economic problems of investing in RES (EKS1C6110)	Current status of the use of renewable energy sources and characteristics of the legal and financial environment.Legislation governing the use of energy from renewable sources, administrative procedures
					and support mechanisms, including EU funds.
147.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Automation and Control in Electrical Power Engineering (EKS1C6151)	Analysis of alternative options for linking the power station to the electricity system in terms of system and power station node operating reliability and economic efficiency.
148.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Nuclear energy (EKS1C6207)	Economic and social aspects of the use of nuclear power. Environmental impact of nuclear power, the problem of waste disposal. Directions of nuclear power development.
149.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Energy efficiency and intelligent lighting systems (EKS1C7055)	Low-energy installations and systems. Improving the energy balance of the system using modern installation solutions.
150.	Faculty of Electrical Engineering	Ecoenergetics	Eng.	Microgeneration (EKS1C7164)	Configuration of generation systems equipped with micro wind and photovoltaic sources; formal requirements for the installation and connection to the lowvoltage electricity grid of generation systems equipped with micro wind and photovoltaic sources

151.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Information technology (EZ1F1003)	To learn about legal and ethical issues related to the use of computer technology. To learn about the principles of work safety, ergonomics and cyber security in working with computers.

152.	Faculty of Electrical Engineering	Electrical engineering	Eng.	New trends in AEiE technologies (EZ1F1008)	Discussing the essence of new technologies in the field of automation, electronics and electrical engineering. Orientation of companies towards innovation and RES solutions. Specifics of new technological ventures.
153.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Materials engineering (EZ1F2015)	Modern materials used in electrical engineering - research and development directions.
154.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Pro-social aspects of the engineer's work (EZ1F3902)	Basic principles of universal design in terms of the design, construction and operation of technical installations. Examples of good engineering practice in the adaptation of public spaces for persons with reduced functionality with particular attention to the specificity of solutions associated with equipment and installations Faculty of Electrical Engineeringmi.
155.	Faculty of Electrical Engineering	Electrical engineering	Eng.	Safety of equipment Faculty of Electrical Engineeringch (EZ1E5023)	Basic concepts of security science in the humantechnical-environmental system
156.	Faculty of Electrical Engineering	Electrical engineering	MA.	Selected issues in lighting technology (EZ2E100007)	Photobiological safety of light sources and the effect of ambient light pollution.

157.	Faculty of Electrical Engineering	Electrical engineering	MA.	Selected topics in the history of electricity (EZ2E300121)	Key developments in the development of electrical engineering and their significance for the development of technology, industry and society . The development of the electrotechnical industry.

158.	Faculty of Electrical Engineering	Electronics and telecommunications	Eng.	Electronic materials engineering (TS1E1003)	An introduction to modern electronic materials with an indication of current developments and the basics of design.
159.	Faculty of Electrical Engineering	Electronics and telecommunications	Eng.	History of electronics (TS1E1801)	Key developments in the development of electrical engineering and their significance for the development of technology, industry and society.
160.	Faculty of Electrical Engineering	Electronics and telecommunications	Eng.	CAD/CAE software (TS1E3015)	Educate on the use of standards and design data.
161.	Faculty of Electrical Engineering	Electronics and telecommunications	Eng.	Power electronics (TS1E4103)	Development trends in power electronics.
162.	Faculty of Electrical Engineering	Electronics and telecommunications	Eng.	Photonic engineering 1 (TS1E4201)	Selected issues in the design and construction of optical fibre networks - legal and normative aspects. Discussion of contemporary developments in the field of photonics.

163.	Faculty of Electrical Engineering	Electronics and telecommunications	Eng.	Microprocessor systems in industrial and network applications (TS1E5106)	All stages of the work are discussed: problem formulation, development of the initial system concept, system hardware design, software preparation, hardware and software commissioning, environmental testing, production implementation, certification, market introduction and validation. During system development, the requirements of production technology, the quality assurance system and the legal requirements of the
					Conformity Assessment Act (CE marking) are taken into account.
164.	Faculty of Electrical Engineering	Electronics and telecommunications	Eng.	Anti-interference protection (TS1E6111)	Be able to recognise nontechnical aspects when formulating or solving simple engineering tasks related to the selection and application of mitigation measures.
165.	Faculty of Electrical Engineering	Electronics and telecommunications	Eng.	Design of data transmission systems (TS1E6214)	The design should include additional case-specific elements and analyses (e.g. legal considerations for the use of the radio equipment used).

166.	Faculty of Electrical Engineering	Electronics and telecommunications	Eng.	Management and security in electronic communication systems (TS1E6220)	Types of threats to telecommunications and computer systems and technical and organisational measures to protect against these threats. Technologies for ensuring and managing high availability and reliability of telecommunication and computer systems.
167.	Faculty of Electrical Engineering	Electronics and telecommunications	MA	Electromagnetic compatibility (TS2E200011)	To know the sources of electromagnetic disturbances, the ways in which they affect electrical and electronic objects and systems, and the hazards they pose. To learn about the legal requirements and procedures and the resulting technical recommendations for electromagnetic compatibility (EMC) of Faculty of Electrical Engineeringcharacteristics and electronic equipment placed on the market.

168.	Faculty of Electrical Engineering	Electronics and Telecommunications (English studies)	Master's degree	Electromagnetic compatibility (TS2E200011)	To acquaint students with the sources of electromagnetic disturbances, how they affect technical objects and electronic and electrical equipment and systems, and the hazards they pose. To acquaint students with the legal requirements as well as the resulting technical recommendations in electromagnetic compatibility (EMC) of electrical and electronic equipment placed on the market.
169.	Faculty of Electrical Engineering	Electronics and telecommunications	MA	Information systems security (TS2E300023)	Acquire practical skills related to the selection and implementation of contemporary measures to ensure the security of information systems.
170.	Faculty of Electrical Engineering	Electronics and Telecommunications (studies in English)	Master's degree	Security of information systems (TS2E300023)	Acquisition of practical skills related to the choice and implementation of modern means to ensure the security of information systems.
171.	Faculty of Electrical Engineering	Electronics and telecommunications	MA	Innovation in the electronics industry (TS2E300133)	To present modern technological and scientific solutions applied in the electronics industry in relation to the production process and their impact on economic development. Identify the consequences of innovation and technology transfer through the organisation of research and development work.

172.	Faculty of Electrical Engineering	Electronics and Telecommunica	Master's degree	Innovations in electronic industry (TS2E300134)	Presentation of modern technological and scientific solutions used in the
		tions (studies in English)			electronics industry in relation to the production process and their impact on economic development. Determining the consequences of innovation and technology transfer through the research and development area.
173.	Faculty of Electrical Engineering	Electronics and telecommunications	Eng.	History of electronics (TZ1E1801)	Key developments in the development of electrical engineering and their significance for the development of technology, industry and society.
174.	Faculty of Electrical Engineering	Electronics and telecommunications	Eng.	Materials engineering and equipment design (TZ1E3015)	An introduction to modern electronic materials with an indication of current developments and the basics of design.
175.	Faculty of Electrical Engineering	Electronics and telecommunications	Eng.	Anti-interference protection (TZ1E6112)	Describes sources of electromagnetic disturbance and disturbance-related phenomena in electronic circuits and systems. Is able, when formulating or solving simple engineering tasks (...) to recognise nontechnical aspects.

176.	Faculty of Electrical Engineering	Electronics and telecommunications	MA	Electromagnetic compatibility (TZ2E200007)	To know the sources of electromagnetic disturbances, the ways in which they affect electrical and electronic objects and systems, and the hazards they pose. To become familiar with legal requirements and procedures and the resulting technical recommendations for the electromagnetic compatibility of Faculty of
					Electrical Engineeringcharacteristics and electronic equipment placed on the market.
177.	Faculty of Electrical Engineering	Electronics and telecommunications	MA	Innovations in the electronics industry (TZ2E300083)	Presentation of modern technological and scientific solutions used in the electronics industry in relation to the production process and their impact on economic development.
178.	Faculty of Electrical Engineering	Electronics and telecommunications	MA	Design of professional electronic apparatus (TZ2E300103)	Electronic systems for the early detection of environmental hazards.
179.	Faculty of Electrical Engineering	Electrical engineering - studies with a practical profile	Eng.	Materials Engineering (EDS1B2011)	Design and manufacturing and processing technologies for electrotechnical materials. Modern materials used in electrical engineering - research and development directions.

180.	Faculty of Electrical Engineering	Electrical engineering - studies with a practical profile	Eng.	UX in innovation (EDS1B3202)	Creating innovative products tailored to customers' needs and real problems. A market perspective on the creation of innovative solutions. Designing the customer journey process as part of the innovations implemented.
181.	Faculty of Electrical Engineering	Electrical engineering - studies with a practical profile	Eng.	Interpersonal communication (EDS1B3203)	Familiarisation with effective communication methods, development of competences for overcoming communication barriers, active listening skills, basics of assertiveness in communication.
182.	Faculty of Electrical Engineering	Electrical engineering - studies with a practical profile	Eng.	Fundamentals of Electrical Power Engineering 1 (EDS1B4022)	Electricity generation. Energy transformations in different types of power plants. Renewable energy sources.
183.	Faculty of Electrical Engineering	Electrical engineering - studies with a practical profile	Eng.	Power electronics (EDS1B4025)	AC/DC converter working with a wind generator and photovoltaic panels, AC/DC converter working with photovoltaic panels and energy storage.
184.	Faculty of Electrical Engineering	Electrical engineering - studies with a practical profile	Eng.	Fundamentals of standardisation and technical law (EDS1B4206)	Demonstrate the key benefits for the company and the national economy of using standards and participating in standardisation.

185.	Faculty of Electrical Engineering	Electrical engineering - studies with a practical profile	Eng.	Technical law and certification - Machinery Directive and Low Voltage Directive in theory and practice (EDS1B4207)	The student acquires theoretical and, to a basic extent, practical knowledge and skills with regard to the conformity assessment system in force in Poland as well as the Machinery Directive and the Low Voltage Directive.
186.	Faculty of Electrical Engineering	Electrical engineering - studies with a practical profile	Eng.	Vehicle electronics systems (EDS1B5034)	Hybrid and electric drive systems.
187.	Faculty of Electrical Engineering	Automation and robotics	Eng.	Robotic manufacturing systems (MYARS16002)	Non-technical aspects of robot use: economic/organisational, social, ethical.
188.	Faculty of Electrical Engineering	Automation and robotics	Eng.	Intelligent automation systems (MYARS26001)	Smart Grid electricity system. Smart "metering". Smart Metering. Internet of Things (IoT). Smart city. Smart building systems. Smart building control technologies.
189.	Faculty of Electrical Engineering	Automatic Control and Robotics (studies conducted in English)	Bachelor's degree	Computer networks (MYARS01006)	The course includes preparation of computer network projects for home users or for small/medium companies. The projects take into account the implementation of the assumed functionalities, as well as data security, convenience of use, etc.

190.	Faculty of Electrical Engineering	Automatic Control and Robotics (studies conducted in English)	Bachelor's degree	Economy for engineers (MYARS01010)	Learning the ability to determine the causes and effects of phenomena in contemporary economic reality, reception and understanding of market signals in a selected industry, establishing the relationship between changes in the macroeconomic environment and decisions of companies in this industry.
191.	Faculty of Electrical Engineering	Automatic Control and Robotics (studies conducted in English)	Bachelor's degree	History of technology (MYARS01012)	Stories of technical progress in selected fields (automatic control and robotics as well as technological devices) with particular emphasis on mechanical structures.
192.	Faculty of Electrical Engineering	Automatic Control and Robotics (studies conducted in English)	Bachelor's degree	Environmental management and ecology (MYARS01013)	The concept of sustainable development as the basis for environmental management. Environmental management system in Poland. Selected areas of environmental management (e.g. waste management, water and sewage management, climate protection, protection of biodiversity).
193.	Faculty of Electrical Engineering	Automatic Control and Robotics (studies conducted in English)	Master's degree	Automation and robotization systems (MYAR2S12005)	Advantages and disadvantages of introducing automation of service, production, industrial processes and building automation. Technological

					unemployment. The use of internet technologies in the automation of homes, cities, enterprises, energy systems, measurement systems, environmental monitoring processes and risk monitoring.
194.	Faculty of Electrical Engineering	Automatic Control and Robotics (studies conducted in English)	Master's degree	Automation systems (MYAR2S22006)	Advantages of introducing automation of service, production, industrial processes and automation of buildings. The use of internet technologies in the automation of homes, cities, enterprises, energy systems, measurement systems, environmental monitoring processes and risk monitoring.
195.	Faculty of Electrical Engineering	Automatic Control and Robotics (studies conducted in English)	Master's degree	Industrial marketing (MYAR2S03007)	Showing the scope and importance of customer relations from the perspective of the company. Determining the importance of marketing in engineering, industry and the development of new technologies.
196.	Faculty of Electrical Engineering	Erasmus		Grid Integration of Renewable Energy (IS-FEE10060W)	The students (...) learn integration of renewable energy into the grid and its challenges and opportunities. This module will also discuss fundamentals of smart grid system, smart metering, real-time pricing, modelling, and control of renewable and green energy

197.	Faculty of Electrical Engineering	Erasmus		Renewable Energy Technologies (IS-FEE10062W)	This module will introduce students to various renewable energy resources and technologies
					used for harnessing them. Students will also be able to understand introductory concepts of economics surrounding renewable energy system.
198.	Department of Architecture	Architecture	Eng.	Environmental psychology	Social and environmental conditioning of humans. Spatial structures, orientation and wayfinding, Environment-behaviour relationships, environmental factors and behaviour Personal space and territoriality, territorial behaviour Diverse human-environment relationships
199.	Department of Architecture	Architecture	Eng.	Design elements 2	Composing spatial architectural forms taking into account human perceptual capabilities and psychophysiological conditions. Principles of interaction in the implementation of the designed facility

200.	Department of Architecture	Architecture	Eng.	Architectural design 2 - recreation	A project for a facility with a public, service or service/residential function, located in a forest, by a river, pond or lake, at the interface of the natural and built environment with exceptional landscape and cultural values, in a location with little urbanisation. The designed building should be subordinate to the landscape qualities of the environment and fit harmoniously into the surrounding space. It should also draw on the cultural heritage of the local, indigenous architecture, especially wood, of the region in which it is built, in a natural
					yet creative way in terms of form, texture and detail. Creative use of natural building materials is recommended: wood, field stone, reed, clay, etc. as well as materials that transpose the spatial and aesthetic qualities of the natural and cultural environment of the place. The ideological message of the architecture and its functionality and aesthetics should be derived from the local spirit of the place.
201.	Department of Architecture	Architecture	Eng.	Architectural design 1 - Single-family housing	Programme and architecture of the house as a reflection of socio-cultural relations. Environmentally friendly house - building issues, energy efficiency.

202.	Department of Architecture	Architecture	Eng.	Universal design	Principles of universal design. Assessment of the accessibility of urban space, the surroundings of facilities and the interiors of buildings for all user groups.
203.	Department of Architecture	Architecture	Eng.	Architectural and urban design 1 - multi-family housing	Theory and practical issues in shaping sustainable urban housing environments.
204.	Department of Architecture	Architecture	Eng.	Building installations	BSM installations and other contemporary so-called smart home solutions.
205.	Department of Architecture	Architecture	Eng.	Design theory and landscape protection	Basic concepts of landscape design and conservation. Natural and cultural landscapes; their development and transformation. Landscape studies. Nature and landscape units. Elements of landscape architecture composition. Types and forms in landscape architecture. Landscape interiors and their elements. Historical and contemporary
					landscapes. Landscape diversity. Threats and principles of protection. Main threats and causes of landscape degradation. Protection and shaping of contemporary landscapes. System of protected areas. Landscape parks. Shaping the city's green space system, creating ecological tracts, airing strips. Green areas forming spatial urban and architectural arrangements

206.	Department of Architecture	Architecture	Eng.	Landscaping and green areas	Development of the design of the landscaping facility preceded by a greenery inventory and the necessary analyses resulting from the findings of studies and development plans.
207.	Department of Architecture	Architecture	Eng.	Architectural design 4 - Energy efficient architecture	Design of a climate-smart building with energy-saving technologies and solutions: insulation, collectors, photovoltaics, turbines, heat pumps, recuperators, lighting systems, heliostats, ventilated double facades, heat accumulators, control systems. Issues of comfort and hygiene of building interiors, environmental relationships, energy loss and gain balance, energy zoning. Basic economics of energy efficient solutions.
208.	Department of Architecture	Architecture	Eng.	Architectural aspect of ecology and environmental protection	Traditional solutions, environmental architecture strand, climatic, geographical, environmental relations, architecture-environment relations, environmental impacts and risks generated by architecture and urbanism. The energy

					balance of modern civilisation. Technologies and solutions to reduce environmental degradation - energy efficient: insulation, collectors, photovoltaics, turbines, heat pumps, recuperators, lighting systems, heliostats, ventilated double facades, heat accumulators, control systems, rainwater retention and utilisation systems. Basic economics of environmental solutions
209.	Department of Architecture	Architecture	Eng.	Rural theory	The village: origins, morphogenetic typologies and contemporary development elements. Adaptation of historical urban and architectural layouts to contemporary needs.
210.	Department of Architecture	Architecture	Eng.	Urban design 1 - Downtown complexes	Criteria for the formation of urban structures. Analysis of conditions: environmental, cultural, social, functional-spatial, communication.
211.	Department of Architecture	Architecture	Eng.	Technical infrastructure of the city	Issues of technical infrastructure and urban engineering in planning studies and urban development strategies.
212.	Department of Architecture	Architecture	Eng.	Communication	The place of communication planning in spatial planning. Regional communication systems. Transport infrastructure and road development as an element of spatial order. Accessible transport space, accessible public transport.

213.	Department of Architecture	Architecture	Eng.	Urban design 2 - development plan	The concept and criteria of spatial order. The scope of prejudices and their consequences in space. Factors shaping urban space. Zoning versus integration. Environmental, cultural and technical conditions of shaping urban space. Principles of sustainable development in local planning.
214.	Department of Architecture	Architecture	Eng.	Architectural heritage of the region	Architecture of Bialystok and the North-Eastern Borderlands as an expression of the multicultural tradition of the borderland; analysis of selected sacred architecture objects of various denominations.
215.	Department of Architecture	Architecture	Eng.	Diploma seminar	Analysis of the functional and spatial relationship of the proposed development with the existing and planned development.
216.	Department of Architecture	Architecture	Eng.	Thesis	Study and analysis of structural relationships, natural or urban context, solution of architectural, urban, functional, technical and construction problems.

217.	Department of Architecture	Architecture	MA	Architectural and urban design 1: 1a - public facilities with a complex function in the context of the city's central public spaces	Shaping the human living environment at different scales of consideration, with a strong connection to the local traditions of the city's communities, on the basis of respect for their diverse cultural, national, ethnic and religious identifications and their life aspirations, in accordance with the principles of sustainable development and taking into account: - the pragmatic and emotional needs of the city's people and society; - social factors (well-being and personal and community development) as commensurate with aesthetic, ecological and technical factors;
					- the role of the architect as a designer of social life; - the principles of participatory design as a process of team and individual action by architects and the public to whom it is addressed; - integration of science, art and technology leading to an aesthetic and technical unity of the work.

218.	Department of Architecture	Architecture	MA	Architectural design 1: 1a - leisure and recreation facilities	Define the author's design architectural solution on the basis of a selfdeveloped, comprehensive study of the landscape and cultural conditions of the site area and the programmatic functional and spatial conditions of the designed building.
219.	Department of Architecture	Architecture	MA	Studies and plans spatial development: 1a - areas of intensive development	Spatial design principles areas with intensive spatial development, an understanding of the environmental conditions and forms of protection of valuable areas, as well as the possibilities and extent of necessary transformations.
220.	Department of Architecture	Architecture	MA	Studies and plans spatial development: 1b - sites undergoing conversion qualitative	Principles of shaping the invested part of the city, intended for qualitative transformation. Transmission of basic knowledge concerning the principles and forms of protection of urbanised areas, the necessary transformations for their revaluation and revitalisation.

221.	Department of Architecture	Architecture	MA	Theory of urban planning and spatial planning	Planning methods, urban programming, optimal solutions. Tools to support spatial development of areas and how to use them. The variety of actors involved in the preparation and elaboration of planning documents for spatial development.

222.	Department of Architecture	Architecture	MA	Management	Contemporary management concepts and methods, especially knowledge management, change management and innovation management.
223.	Department of Architecture	Architecture	MA	Environmental psychology	Nature versus human nature, environmental diagnosis, regenerative action of nature, environmental perception, cognitive maps, orientation and wayfinding, Environment-behaviour relations, environmental factors and behaviour Personal space and territoriality, territorial behaviour. Environmental responsibility
224.	Department of Architecture	Architecture	MA	Design architectural and urban planning 2: 2c - production and service facilities in the context of industrial sites	Analysis of design solutions - land development in a suburban area for the service and production function, referring to local urban and natural conditions. Familiarisation with basic environmental considerations.
225.	Department of Architecture	Architecture	MA	Regional planning	Types of regions and their identification. Planning and land use issues at the regional scale. Regional development and its components. The

					essence and factors of regional competitiveness. Methods and instruments of planning and tools supporting spatial development. Analysis of conditions and determination of directions for regional development. Development strategy as an instrument of regional management. Prospective studies - formulation of vision, mission and development objectives. Contemporary regional problems of the Polish space. Problems of European integration, regional cooperation. The role of European Union regional policy and Polish regional development. The natural basis of regional planning. Localisation policy and its contemporary issues. Regional transport systems. Regional technical infrastructure nodes and routes: water management, energy management, etc.
226.	Department of Architecture	Architecture	MA	Barrier-free design	Principles of universal design in architectural and urban design.
227.	Department of Architecture	Architecture	MA	Sociology of housing and the city	Critical analysis of spatial concepts in terms of their social phenomena, positive or negative impacts of specific spaces on environmental quality
228.	Department of Architecture	Architecture	MA	Thesis	Studies and analyses of structural relationships, natural or urban context, 'case studies', solving architectural, urban,

					functional, technical and construction problems.
229.	Department of Architecture	Architecture interiors	Eng.	Ergonomics	Knowledge of ergonomic principles, its multidisciplinary scope and typically utilitarian nature. The ability to identify the relationships that arise between people and their occupation, equipment and environment in the broadest sense of the word, including situations related to industrial activities and their effects.
230.	Department of Architecture	Architecture interiors	Eng.	Materials science	Learning about materials in a wide range of interior design applications. Gain knowledge of on their processing, extraction technology, manufacture and use depending on the from their properties and purpose. Awareness of their environmental impact
231.	Department of Architecture	Architecture interiors	Eng.	design (functional forms)	Skills acquisition carry out a functional, formal and artistic analysis of the selected form in terms of historical, social and utilitarian. Making the right technology and material choices performance of the designed object.
232.	Department of Architecture	Architecture interiors	Eng.	general construction	Teaching recognition and selection of building materials.

233.	Department of Architecture	Architecture interiors	Eng.	building installations	Standard technical and sanitary equipment of modern buildings in the light of
					regulations in force. Requirements for the microclimate of rooms in buildings Residential and similar buildings. Methods of heat recovery in residential and similar buildings.
234.	Department of Architecture	Architecture interiors	Eng.	Architectural design 1	Ideological, programmatic and structural shaping of residential development single-family housing of various types in cities. Consideration of objective and subjective needs users in the functional and spatial solution of the individual house. Shaping the form of the building in relation to the urban conditions and the character of the site.
235.	Department of Architecture	Architecture interiors	Eng.	Legislation (construction law)	Practical application of the art of building and architectural design methodology, urban and spatial planning within the framework of current legislation and regulations.

236.	Department of Architecture	Architecture interiors	Eng.	Economics of the investment process	Capital expenditure and methods of determining it. Costing Value of Investment. Simple and developed evaluations of the economic viability of investment projects. Efficiency analysis cost
237.	Department of Architecture	Architecture interiors	MA	Design 1	The design of the programmatically advanced forms is preceded by an indepth analysis of function, a search for form and
					material-constructionplastic solutions in the context of specific -spatial, functional, artistic and social - conditions.
238.	Department of Architecture	Architecture interiors	MA	Psychology of space design	Demonstrate the interconnection and interaction between space and viewer. The influence of space parameters on user behaviour. Universal design - designing for all. Social attitudes.
239.	Department of Architecture	Graphics	lic	Design	Constructing and analysing structures. Optimisation and rational use of material
240.	Department of Architecture	Graphics	lic	Packaging	Single pack or series of packs made using different printing technologies. Properties of different materials. Technological possibilities

241.	Department of Architecture	Graphics	lic	Identification of spaces	Perception in space / perception of space itself / perception of space by visually impaired people / hierarchy of signs and information in public space / signposting / urban navigation / creation of signposting systems / creation of signposting systems in large scale and small scale spaces / accessible space - accessibility for people with disabilities / functionality of signposting
242.	Faculty of Mechanical Engineering	Mechatronics	Eng.	Intelligent building systems	Types of control standards in intelligent buildings. Communication between individual devices. Types, construction and principles of operation of sensors and actuators. Data collection and archiving. Configuration, commissioning and testing of the selected smart system. Project: design of an intelligent installation in a single-family house.

243.	Faculty of Mechanical Engineering	Automation and robotics, Mechanics and mechanical engineering, biomedical engineering, mechatronics	MA.	Innovative entrepreneurship and technology transfer	Definition of innovation, types and sources of innovation. Technology transfer and innovation activity of firms. Technology transfer in innovation models. Sources of inspiration for innovative ventures. Methods of creating innovation. Phases of implementation of an innovative business venture. International technology transfer. Creating a business model for an innovation venture (customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partners, cost structure).
244.	Faculty of Mechanical Engineering	Mechanics and mechanical engineering	MA.	Operation of thermal power systems	Environmental impact of refrigerants and relevant environmental regulations, Environmentally friendly handling of the system and refrigerant during installation, maintenance, servicing or recovery of the refrigerant, National system for the marketing of COCs and F-gases, registration of equipment, responsibilities of the operator and personnel operating HVACR equipment.

245.	Faculty of Mechanical Engineering	mechanics and mechanical engineering	MA.	Thermal power stations	Environmental considerations for working fluid applications. Technologies for improving the energy efficiency of refrigeration and heat pump systems. Analysis of energy efficiency of refrigeration systems including identification of operating parameters at system characteristic points. Issues in the selection of basic components of refrigeration automation. Calculation of the required cooling capacity of a refrigeration or heat pump system.
246.	Mechanical	mechanics and mechanical engineering	MA.	Refrigeration and heat pump technologies	Thermodynamic and thermokinetic properties of refrigerants and heat transfer media and their influence on the energy efficiency of refrigeration systems. Environmental considerations for working fluid applications. Technologies to improve the energy efficiency of refrigeration systems and heat pumps. Analysis of the energy efficiency of refrigeration systems including identification of operating parameters at system characteristic points. Issues in the selection of basic components of refrigeration automation. Calculation of the required cooling capacity of a refrigeration or heat pump system.

247.	Faculty of Mechanical Engineering	mechanics and mechanical engineering	MA.	Polygeneration systems and renewable energy sources	Technologies to improve the efficiency of steam power plants: cycle carnation, interstage superheating. Engine room efficiency. Apparatus equipment of steam power plants. Elementary calculations of the Rankine cycle including turbine efficiency. Calculation of power plant cycle with interstage superheat. Gas engine room Brayton cycle calculation. Calculation of components of a steam power plant regeneration system.