



Subject card

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| Subject name and code | ALTERNATIVE ENERGY SOURCES, PG_00049189 | | | | | | |
| Field of study | Green Technologies | | | | | | |
| Date of commencement of studies | October 2024 | Academic year of realisation of subject | | | 2024/2025 | | |
| Education level | second-cycle studies | Subject group | | | Obligatory subject group in the field of study | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 1 | Language of instruction | | | English | | |
| Semester of study | 2 | ECTS credits | | | 2.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Department of Energy Conversion and Storage -> Faculty of Chemistry | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr inż. Anna Dettlaff | | | | |
| | Teachers | | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 0.0 | 0.0 | 15.0 | 0.0 | 30 |
| | E-learning hours included: 0.0 | | | | | | |
| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | | Participation in consultation hours | | Self-study | SUM |
| | Number of study hours | 30 | | 5.0 | | 15.0 | 50 |
| Subject objectives | Introducing students to the renewable energy sources | | | | | | |

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| Learning outcomes | Course outcome | Subject outcome | Method of verification |
| | [K7_K03] can consciously and supported by the experience to present your work, provide information in a manner commonly understood, to communicate, to make self-assessment and constructive criticism of the work of others, the reasons for different points of view | Student is able to specify and describe the traditional and renewable energy sources, knows their drawbacks, advantages, and environmental impact. | [SK2] Assessment of progress of work |
| | [K7_W05] has an broader knowledge of the advanced concepts and problems of quality management, application of the principles of work organization and integrated management and the knowledge necessary to understand the social, economic, legal and other non-technical considerations engineering activities, knows the basic principles of health and safety in force in environmental | The student has knowledge of non-technical conditions related to renewable energy sources. | [SW1] Assessment of factual knowledge |
| | [K7_W03] will have a detailed knowledge of the theoretical basis of methods and types of apparatus used in chemical analysis of environmental pollutants and the technology of cleaning and neutralization of industrial waste and wastewater management and the design and supervision of environmentally friendly technologies | Student knows how to convert solar, wind, hydro, biomass, geothermal and other energy into useful form of energy, like heat or electricity. | [SW1] Assessment of factual knowledge |
| | [K7_U03] capable of formulating and solving design tasks in the field of environmental technology to recognize their non-technical aspects, including environmental, economic and legal. Applies the principles of occupational health and safety | Student is able to assess and rank the resources of various types of renewable energy sources available today and in the future. | [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools |
| Subject contents | <p>Characteristics and estimation of conventional energy resources and their impact on environmental contamination. Presentation of the types, resources and possibilities of using environmentally friendly renewable energy sources, such as: hydropower (energy of water flow, energy of water level differences, wave energy, tidal energy, energy of currents); solar energy (low-temperature and high-temperature solar energy systems, active and passive systems, decentralized systems, centralized systems, solar collectors, photovoltaic cells); wind energy (lifting force, onshore and offshore wind farms); geothermal energy (geothermal energy resources, geothermal plants, heat pumps); solid, liquid and gas biofuels (energy wood, straw, biodiesel, bioethanol, biomethanol, biohydrogen, biogas, wood gas). Energy storage as a way to make renewable energy sources independent of the weather (technologies of mechanical, electrochemical, electrical, chemical and thermal energy storage, hydrogen energy, galvanic cells, fuel cells, electrochemical capacitors).</p> | | |
| Prerequisites and co-requisites | | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Test | 60.0% | 100.0% |

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| Recommended reading | Basic literature | <p>W. M. Lewandowski, E. Klugmann-Radziemska Proekologiczne odnawialne źródła energii. Kompendium, Wydawnictwo Naukowe PWN, 2017</p> <p>W. M. Lewandowski, M. Ryms Biopaliwa. Proekologiczne odnawialne źródła energii, WNT, 2013</p> <p>M. Budziszewska, A. Kardaś, Z. Bohdanowicz Klimatyczne ABC. Interdyscyplinarne podstawy współczesnej wiedzy o zmianie klimatu, Wydawnictwa Uniwersytetu Warszawskiego, 2021</p> <p>B.K. Hodge Alternative Energy systems and applications, Wiley, 2017</p> <p>E.E. Michaelides Alternative Energy Sources, Springer, 2012</p> <p>B. Viswanathan Energy Sources. Fundamentals of Chemical Conversion Process and Applications, Elsevier, 2017</p> <p>I. Stober, K. Bucher Geothermal Energy: From Theoretical Models to Exploration and Development Springer-Verlag Berlin Heidelberg, 2013</p> <p>T. Abbasi, S.M. Tauseef, S.A. Abbasi, Biogas Energy, Springer, 2012</p> |
| | Supplementary literature | No recommendations |
| | eResources addresses | Adresy na platformie eNauczenie: |
| Example issues/ example questions/ tasks being completed | <p>What are the differences between a solar collector and a photovoltaic cell?</p> <p>Describe how the heat pump works.</p> | |
| Work placement | Not applicable | |