



Subject card

|   |   |  |                                     |            |  |  |     |
|---|---|--|-------------------------------------|------------|--|--|-----|
| Subject name and code                       | Thermal conversion technologies, PG_00055937  |  |                                     |            |  |  |     |
| Field of study                              | Power Engineering   |  |                                     |            |  |  |     |
| Date of commencement of studies             | October 2024  | Academic year of realisation of subject  |                                     |            |  | 2026/2027  |     |
| Education level                             | first-cycle studies   | Subject group  |                                     |            |  | Optional subject group<br>Subject group related to scientific research in the field of study |     |
| Mode of study                               | Full-time studies   | Mode of delivery   |                                     |            |  | at the university  |     |
| Year of study                               | 3   | Language of instruction  |                                     |            |  | Polish   |     |
| Semester of study                           | 5   | ECTS credits   |                                     |            |  | 2.0  |     |
| Learning profile                            | general academic profile  | Assessment form  |                                     |            |  | assessment   |     |
| Conducting unit                             | Department of Energy and Industrial Apparatus -> Faculty of Mechanical Engineering and Ship Technology  |  |                                     |            |  |  |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor  | dr inż. Bartosz Dawidowicz   |                                     |            |  |  |     |
|   | Teachers  |  |                                     |            |  |  |     |
| Lesson types and methods of instruction     | Lesson type   | Lecture  | Tutorial                            | Laboratory | Project  | Seminar  | SUM |
|   | Number of study hours   | 15.0   | 15.0                                | 0.0        | 0.0  | 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   | 2.0                                 |            | 18.0   | 50   |     |
| Subject objectives                          | The aim of the course is to acquaint students with the waste management which is the energy use of waste as well as presentation of the physical fundamentals and construction of devices for thermal treatment of waste.   |  |                                     |            |  |  |     |
| Learning outcomes                           | Course outcome  | Subject outcome  |                                     |            | Method of verification   |  |     |
|   | [K6_U08] can design the basic parameters of the selected technology related to energy conversion and select auxiliary devices and evaluate the project in terms of technical and economic   | The student skillfully uses tools supporting engineering design. He independently carries out the project, makes correct calculations and interprets the obtained results  |                                     |            | [SU3] Assessment of ability to use knowledge gained from the subject |  |     |
|   | [K6_U05] is able to formulate and carry out energy balances in devices and energy systems, also perform an energy audit of a simple building object, is able to perform a preliminary profitability analysis of a planned energy investment   | The student performs energy calculations and makes balance energy systems. Based on data and calculations, it performs an investment profitability analysis.   |                                     |            | [SU3] Assessment of ability to use knowledge gained from the subject |  |     |
|   | [K6_W06] knows classic and developmental energy technologies, rules for the selection and operation of heat and energy devices and installations, basic principles of energy systems operation, basic issues regarding the reliability of energy devices and diagnostics, environmental effects of energy technologies used, methods of using renewable energy sources  | The student's knowledge includes knowledge of classical and renewable energy sources. He knows the physical laws of these processes. They presented the construction and operation of energy conversion devices. Has knowledge of the effects of both classic and renewable energy sources on the natural environment. He knows what are the limitations of the use of renewable energy sources and their profitability. |                                     |            | [SW1] Assessment of factual knowledge                                |  |     |
| Subject contents                            | LECTURE Thermal utilization of wastes. Burning and incineration of wastes. Basic constructions of incinerating wastes. Wastes gasification. Example reactions and process gasification types. Pyrolysis of wastes. Example reactions and process pyrolysis types. Construction of pyrolyzers. Plasma decomposition. Examples of plasma installation. Methods of utilization of secondary wastes. LABORATORY Departure to incinerating wastes. |  |                                     |            |  |  |     |

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| Prerequisites and co-requisites                                | Knowledge of physics, chemistry and thermodynamics.  |  |                               |
| Assessment methods and criteria                                | Subject passing criteria   | Passing threshold  | Percentage of the final grade |
|  | Laboratory - Test  | 56.0%  | 25.0%                         |
|  | Lecture - Test   | 56.0%  | 75.0%                         |
| Recommended reading  | Basic literature   | 1. Piecuch T.: Utylizacja odpadów przemysłowych, Wyd. Ucz. PK, Koszalin 20004. 2. Rybak W.: Spalanie i współspalanie biomasy, Oficyna Wyd. PWr., Wrocław 20065. 3. Bilitewski B., Härdtkke G., Marek K.: Podręcznik gospodarki odpadami. Wyd. Seidel i Przywecki, W-wa, 2006 |                               |
|  | Supplementary literature   | 1. Thermal utilization of wastes - conference materials 2. Fuel from wastes - conference materials   |                               |
|  | eResources addresses   | Adresy na platformie eNauczanie:   |                               |
| Example issues/<br>example questions/<br>tasks being completed | 1. What is the alternative fuel? 2. What are the thermal waste treatment processes? 3. The production of biogas. |  |                               |
| Work placement   | Not applicable   |  |                               |

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