



## Subject card

|   |   |  |   |                                     |                                       |            |     |
|---|---|--|---|-------------------------------------|---------------------------------------|------------|-----|
| Subject name and code                       | , PG_00062023   |  |   |                                     |                                       |            |     |
| Field of study                              | Power Engineering, Power Engineering, Power Engineering   |  |   |                                     |                                       |            |     |
| Date of commencement of studies             | February 2023   |  | Academic year of realisation of subject   |                                     | 2023/2024                             |            |     |
| Education level                             | second-cycle studies  |  | Subject group   |                                     |                                       |            |     |
| Mode of study                               | Full-time studies   |  | Mode of delivery  |                                     | at the university                     |            |     |
| Year of study                               | 1   |  | Language of instruction   |                                     | Polish                                |            |     |
| Semester of study                           | 2   |  | ECTS credits  |                                     | 3.0                                   |            |     |
| Learning profile                            | general academic profile  |  | Assessment form   |                                     | assessment                            |            |     |
| Conducting unit                             | Zakład Maszyn Przepływowych -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology   |  |   |                                     |                                       |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor  |  | dr hab. inż. Marian Piwowarski  |                                     |                                       |            |     |
|   | Teachers  |  |   |                                     |                                       |            |     |
| Lesson types and methods of instruction     | Lesson type   | Lecture  | Tutorial  | Laboratory                          | Project                               | Seminar    | SUM |
|   | Number of study hours   | 30.0   | 0.0   | 0.0                                 | 15.0                                  | 0.0        | 45  |
|   | 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   | 45   |   | 8.0                                 |                                       | 22.0       | 75  |
| Subject objectives                          | The purpose of the course is to familiarize students with the construction of nuclear power plants and the technology of nuclear power generation.  |  |   |                                     |                                       |            |     |
| Learning outcomes                           | Course outcome  |  | Subject outcome   |                                     | Method of verification                |            |     |
|   | [K7_W07] knows the environmental effects of energy technologies used; is familiar with the issues of effective energy management and use of renewable energy sources, has a broad and well-established knowledge of the processes of energy production and use  |  | The student has basic knowledge related to the construction and operation of equipment of nuclear power plants.   |                                     | [SW1] Assessment of factual knowledge |            |     |
|   | [K7_W06] knows the extended issues of reliability of power equipment and diagnostics of defects in this equipment   |  | The student knows nuclear power plants with Generation II, III/III+ and IV reactors. He knows the environmental effects of current generation nuclear power plants. |                                     | [SW1] Assessment of factual knowledge |            |     |
|   | [K7_U05] is able to integrate technical and economic analysis of the use of various energy technologies, including technologies using renewable energy sources and conventional and nuclear energy  |  | Students can describe and calculate the circuits of nuclear power plants and the processes occurring in thermal and fast nuclear reactors.                          |                                     | [SU1] Assessment of task fulfilment   |            |     |
| Subject contents                            | Nuclear Reactions. Historical outline of nuclear power. Nuclear energy in the world. Nuclear fuels and their properties. Classification of nuclear reactors. Construction of basic types of nuclear units. Efficiency of nuclear power plants. Nuclear fuel cycle. Safety systems used in nuclear power plants. Waste storage. The future of nuclear power. |  |   |                                     |                                       |            |     |
| Prerequisites and co-requisites             | Fundamentals of thermodynamics  |  |   |                                     |                                       |            |     |
| Assessment methods and criteria             | Subject passing criteria  |  | Passing threshold   |                                     | Percentage of the final grade         |            |     |
|   | Kolokwium   |  | 50.0%   |                                     | 100.0%                                |            |     |

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| Recommended reading  | Basic literature   | <ul style="list-style-type: none"> <li>• Perycz S. Turbiny parowe elektrowni jądrowych, Wydawnictwo Politechniki Gdańskiej, Gdańsk 1986;</li> <li>• Celiński Z., Strupczewski A.: Podstawy energetyki jądrowej, WNT, Warszawa 1984.</li> <li>• Ackermann G. (red.): Eksploatacja elektrowni jądrowych, WNT, Warszawa 1987.</li> <li>• Kubowski J.: Nowoczesne elektrownie jądrowe, WNT, Warszawa 2010.</li> </ul>  |
|  | Supplementary literature   | <ul style="list-style-type: none"> <li>• Kosowski K. et al.: Steam and gas turbines. Principles of operation and design. ALSTOM; Francja, Szwajcaria, Wielka Brytania, Polska 2007</li> <li>• Kielkiewicz M.: Jądrowe reaktory energetyczne, WNT, Warszawa 1978.</li> <li>• Jeleń K., Rau Z.: Energetyka jądrowa w Polsce. Wolters Kluwer Polska Sp. z o.o., Warszawa 2012.</li> <li>• Jezierski G.: Energetyka jądrowa wczoraj i dziś. WNT, Warszawa 2005.</li> </ul> |
|  | eResources addresses   | Adresy na platformie eNauczanie:   |
| Example issues/<br>example questions/<br>tasks being completed | Discuss the components of a nuclear power plant with a PWR reactor. Discuss a nuclear power plant with an SCWR reactor. Illustrate the temperature-entropy circuit of any nuclear power plant. |  |
| Work placement   | Not applicable   |  |