GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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| Subject name and code | Energy Supply Systems, PG_00042317 | | |
| Field of study | Electrical Engineering | | |
| Date of commencement of studies | October 2023 | Academic year of realisation of subject | 2023/2024 |
| Education level | second-cycle studies | Subject group | |
| Mode of study | Part-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 | Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Tomasz Minkiewicz | |
| | Teachers | dr inż. Tomasz Minkiewicz | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 10.0 | 0.0 | 10.0 | 0.0 | 0.0 | 20 |

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 | 20 | 7.0 | 48.0 | 75 |

**Subject objectives**

The purpose of this course is to familiarize students with energy supply systems, for example electricity and district heating sector.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| K7_W02 | The student describes the parameters of the quality of electricity and determines the source of disturbances. | [SW1] Assessment of factual knowledge |
| K7_U02 | The student is able to search and develop materials on technical issues on a selected topic and present them as an oral presentation. | [SU5] Assessment of ability to present the results of task<br>[SU2] Assessment of ability to analyse information<br>[SU1] Assessment of task fulfilment |
| K7_U03 | The student appreciates the importance of self-expanding knowledge and skills in the field of studies in related fields. | [SU3] Assessment of ability to use knowledge gained from the subject |
| K7_W01 | Student is able to determine the characteristic data of conventional power plants, in particular efficiency, power and energy produced in the system. | [SW1] Assessment of factual knowledge |

**Subject contents**

**Lecture:** Basic data of the Polish Power System. Heat demand characteristics. Centralized energy sources. Combined heat and power production. Tasks and demands of centralized and regional operating energy supply systems. Heat carriers and their parameters. Configuration of district heating systems (DHS). Types and schemes of DHS. Ways of connecting heating consumers. Route planing and ducting of the transport pipelines. Equipment of DHS (pipelines, fittings, pipe bearers, inspection chambers). The process of producing of electricity and heat.

**Laboratory:** Load curves. Enthalpy and entropy. Thermal cycles in power plants and combined heat and power plants. Heat-flow calculations of heat distribution network.

**Prerequisites and co-requisites**

Good knowledge of basic physics (basic laws of physics, physical quantities and their units and measures, mechanics, electrical engineering, thermodynamics, heat transfer). Knowledge of energy processes' properties: efficiency of single conversion, efficiency of conversion cycle and thermodinamic cycle efficiency. Basic knowledge of mathematics: algebra, geometry, trigonometry, differential and integral calculus.

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| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Lecture test | 60.0% | 60.0% |
| | Reports | 60.0% | 40.0% |
| Recommended reading | Basic literature | 1. Marecki J.: *Skojarzona gospodarka cieplno-elektryczna*. Wydanie 3. WNT, Warszawa 1991<br>2. Kamler W.: *Ciepłownictwo*. PWN, Warszawa 1976<br>3. Krygier K.: *Sieci cieplne*. Skrypt Politechniki Warszawskiej. Wydawnictwa Politechniki Warszawskiej, Warszawa 1993 | |
| | Supplementary literature | 1. Szkarowski A., Łatkowski L.: *Ciepłownictwo*. WNT, Warszawa 2006<br>2. Krygier K.: *Sieci ciepłownicze. Materiały pomocnicze do ćwiczeń*. Skrypt Politechniki Warszawskiej. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2012 | |
| | eResources addresses | Adresy na platformie eNauczanie:<br>SYSTEMY ZAOPATRZENIA W ENERGIĘ [ET][II][Niestacjonarne] [2023/24] - Moodle ID: 36132<br>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36132 | |
| Example issues/ example questions/ tasks being completed | 1. Heat demand characteristics.<br>2. Tasks and demands of centralized and regional operating energy supply systems.<br>3. Heat carriers and their parameters.<br>4. Elements of thermal and hydraulic calculations. | | |
| Work placement | Not applicable | | |