



Subject card

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|---|--|--|--|------------------------|--|---------|--|--|--|
| Subject name and code | , PG_00058837 | | | | | | | | |
| Field of study | Environmental Engineering | | | | | | | | |
| Date of commencement of studies | October 2023 | Academic year of realisation of subject | | 2025/2026 | | | | | |
| Education level | first-cycle studies | Subject group | | Optional subject group | | | | | |
| Mode of study | Full-time studies | Mode of delivery | | at the university | | | | | |
| Year of study | 3 | Language of instruction | | Polish | | | | | |
| Semester of study | 6 | ECTS credits | | 3.0 | | | | | |
| Learning profile | general academic profile | Assessment form | | assessment | | | | | |
| Conducting unit | Department of Sanitary Engineering -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology | | | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor Teachers | dr hab. inż. Ewa Zaborowska | | | | | | | |
| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | | | |
| | Number of study hours | 15.0 | 0.0 | 0.0 | 30.0 | 0.0 | | | |
| | 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 | 5.0 | 33.0 | 83 | | | | |
| Subject objectives | The aim of the subject is to acquaint students with detailed knowledge in the range of heating sub-stations and networks, current regulations and standards related to the subject, materials types and selection criteria, methods and tools supporting designing process, methods and technologies of installation. The subject objective is to acquire skills in the range of application of calculation methodology and the principles of designing. | | | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | | | |
| | [K6_U13] knows the rules of application and can choose the materials of the sanitary industry | | Knows the rules of selection of materials for heating networks and installations | | [SU3] Assessment of ability to use knowledge gained from the subject | | | | |
| | [K6_W07] has a structured and theoretically founded knowledge in the field of materials used in the sanitary industry, their physico-chemical properties; knows and understands the basic processes of their production | | Has organized knowledge in the range of materials, fittings and devices used in district heating | | [SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects | | | | |
| | [K6_U03] can prepare documentation regarding the implementation of an engineering task/project and prepare a text or presentation including a discussion of the results of the implementation | | Can prepare documentation on a project of heating substation and district heating network, and present results of calculations | | [SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject | | | | |
| | [K6_W11] has elementary knowledge of electrical devices and installations as well as basics of control and automation | | Has knowledge in the range of control and regulation of heating substations. | | [SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects | | | | |
| | [K6_U16] can, when formulating and solving engineering tasks in environmental engineering, evaluate, select and apply appropriate methods and tools, recognize their non-technical aspects, including environmental, economic and legal aspects | | Is able to select and apply appropriate methods and tools when solving design tasks. | | [SU4] Assessment of ability to use methods and tools | | | | |

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| Subject contents | <p>Course content – lecture</p> <p>LECTURE: Classification, configuration and systems of heat distribution networks. Traditional and preinsulated, underground and over ground systems. Materials, components, fittings. Preinsulated systems characteristics. Monitoring systems. Methods of preinsulated underground pipes designing. Stress, elongation, compensators, fixed points. Compensation area. Branches, walls crossing, preinsulated fittings. Principles of assembling, joint sets. Pipes laying in excavation, distance from obstacles, buildings, other pipelines. Heat loss. Technical requirements, codes and standards. PROJECT: Project of heating substation, joined to high-parameters district heating network. Schematic, technological diagrams. Hydraulic calculations of primary and secondary circuits. Fittings, devices and thermal insulation matching. Filling and refilling systems. Water, sewage and ventilation systems in a heating substation room. Technical requirements and tests. Project of a district heating preinsulated network. Location of fixed points, pipelines geometry, dimensioning of compensation area. Designing of branches, walls crossing and pipes laying in excavation. Technical requirements and test.</p> | | | | |
| Prerequisites and co-requisites | Basics of hydraulics and thermodynamics. Basic knowledge in the range of heating and heating substations substations. Drawing skills in AutoCAD. | | | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade | | |
| | Midterm colloquium | 50.0% | 40.0% | | |
| | Project | 50.0% | 60.0% | | |
| Recommended reading | <p>Basic literature</p> <p>1. Randlov P., Podręcznik ciepłownictwa system rur preizolowanych, European District Heating Pipe Manufacturers Association, Warszawa, 1998. 2. Zaborowska E., Zasady projektowania wodnych węzłów ciepłowniczych. Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2010 or other edition year. 3. Regulations, Polish and European Standards related to the subject, COBRTI Instal technical requirements.</p> <p>Supplementary literature</p> <p>1. Żarski K., Projektowanie preizolowanych sieci cieplnych w technologii ABB Zamech. ABB Zamech Ltd, Toruń, 1994. 2. Żarski K.: Węzły cieplne w miejskich systemach ciepłowniczych. Poradnik. Wyd. 2. Wydawnictwo Instal, Warszawa 2014. 3. Wytyczne producentów, karty katalogowe armatury i urządzeń.</p> <p>eResources addresses</p> | | | | |
| Example issues/ example questions/ tasks being completed | <p>1. Project of a heating substation.</p> <p>2. Project of a heating network.</p> | | | | |
| Practical activites within the subject | Not applicable | | | | |

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