



Subject card

|   |   |  |          |                                     |  |            |     |
|---|---|--|----------|-------------------------------------|--|------------|-----|
| Subject name and code                       | Water supply systems II, PG_00043647  |  |          |                                     |  |            |     |
| Field of study                              | Environmental Engineering   |  |          |                                     |  |            |     |
| Date of commencement of studies             | October 2020  | Academic year of realisation of subject                  |          |                                     | 2022/2023  |            |     |
| Education level                             | first-cycle studies   | Subject group  |          |                                     | Obligatory subject group in the field of study<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                           | 6   | ECTS credits   |          |                                     | 2.0  |            |     |
| Learning profile                            | general academic profile  | Assessment form  |          |                                     | assessment   |            |     |
| Conducting unit                             | Department of Sanitary Engineering -> Faculty of Civil and Environmental Engineering  |  |          |                                     |  |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor  | dr inż. Dominika Sobotka                                 |          |                                     |  |            |     |
|   | Teachers  | dr inż. Dominika Sobotka<br>dr inż. Nicole Nawrot        |          |                                     |  |            |     |
| Lesson types and methods of instruction     | Lesson type   | Lecture  | Tutorial | Laboratory                          | Project  | Seminar    | SUM |
|   | Number of study hours   | 0.0  | 0.0      | 0.0                                 | 30.0   | 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   |          | 3.0                                 |  | 20.0       | 53  |
| Subject objectives                          | The aim of the course is to acquire by the student the ability to use technical knowledge to solve problems using the classical methods of designing elements of the water distribution system. |  |          |                                     |  |            |     |

| 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  | The student knows the properties of materials used in the construction of water networks and devices and is able to choose them.  | [SU2] Assessment of ability to analyse information   |
|                                 | [K6_U12] can design installations, networks and facilities: water supply, sewage, heating and gas  | The student is able to define the technological scheme of objects and define the parameters of devices.   | [SU1] Assessment of task fulfilment<br>[SU4] Assessment of ability to use methods and tools  |
|                                 | [K6_U11] can use selected computer programs to support design, including CAD graphics programs   | The student is able to use computer programs supporting hydraulic calculations of the water supply network and the selection of pumps.  | [SU1] Assessment of task fulfilment<br>[SU4] Assessment of ability to use methods and tools  |
|                                 | [K6_K02] understands the need to formulate and communicate to the public information and opinions on the achievements of environmental engineering and other aspects of the sanitary industry engineer's activity; is aware of the importance and understands the non-technical aspects and effects of engineering activities; makes efforts to provide such information and opinions in a widely understandable way, presenting different points of view  | The student is aware of and understands the consequences of the environmental impact of activities in the field of engineering design and operation of water supply.                                | [SK5] Assessment of ability to solve problems that arise in practice   |
|                                 | [K6_W09] has ordered, theoretically founded knowledge in the field of water supply, sewage, heating, ventilation and air conditioning, and the principles of shaping the microclimate of rooms; knows legal regulations, standardization issues and recommendations for the design of water supply, sewage, heating and gas networks and installations   | The student knows and is able to use the standards and recommendations for the design of water supply systems contained in the regulations.   | [SW1] Assessment of factual knowledge<br>[SW3] Assessment of knowledge contained in written work and projects  |
|                                 | [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  | The student knows the physical and mechanical properties of materials used in the construction of water networks and devices.   | [SW1] Assessment of factual knowledge  |
|                                 | [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  | The student is able to independently make a preliminary design, including hydraulic calculations and drawings. In addition, it defines the parameters of devices and selects them from the catalog. | [SU2] Assessment of ability to analyse information<br>[SU3] Assessment of ability to use knowledge gained from the subject<br>[SU4] Assessment of ability to use methods and tools |
| Subject contents                | <p>Design a water distribution system for a medium-sized city (up to 100,000 inhabitants) together with facilities (intake, pumping stations, network reservoir) based on the output data, along with the location and height plan and spatial development plan for the city. The project is a conceptual design stage with elements of a construction project in the field of:</p> <ul style="list-style-type: none"> <li>• water balance for residents and industry,</li> <li>• water supply network routing on a city plan,</li> <li>• dimensioning of the trunk network using the Cross method along with its infrastructure,</li> <li>• determination of the pressure line run on the profile for <math>Q_{dmax}</math>, <math>Q_{hmax}</math> and <math>Q_{hmax} + Q_{ppoż}</math>,</li> <li>• determining the dimensions of the network tank and pump parameters along with their selection from the catalog,</li> <li>• zoning of the water supply network.</li> </ul> |   |  |
| Prerequisites and co-requisites | Basic knowledge of fluid mechanics and hydraulics, geology. Knowledge of the principles of hydraulic calculations, knowledge of the following subjects: installation materials and soil mechanics.   |   |  |

| Assessment methods and criteria                                | Subject passing criteria | Passing threshold   | Percentage of the final grade |
|--|--------------------------|---|-------------------------------|
|  | Calculations             | 70.0%   | 35.0%                         |
|  | Graphic part             | 70.0%   | 35.0%                         |
|  | A technical description  | 70.0%   | 30.0%                         |
| Recommended reading  | Basic literature         | <ol style="list-style-type: none"> <li>1. Materials for classes from the 5th semester of the Water supply course</li> <li>2. Projektowanie sieci wodociagowych, Wiktor Petrozolin , wyd. ARKADY, 1967</li> <li>3. Wodociagi: zapotrzebowanie, ujęcie, dostarczanie, gromadzenie, rozprowadzenie wody, Tadeusz Gabryszewski, PWN, 1973 3. Obliczanie systemów zaopatrzenia w wodę, Edward Mielcarzewicz , wyd. ARKADY, 2001</li> <li>4. Zaopatrzenie w wodę i odprowadzenie ścieków, Marek Kalenik , wyd. SGGW, 2009</li> <li>5. Zaopatrzenie w wodę, Ziemowit Suligowski, Sylwia Fudala Książek, wyd. Seidel Przywecki, 2014</li> <li>6. Sieci i obiekty wodociagowe, Elżbieta Osuch Pajdzińska , Marek Roman, Oficyna Wydawnicza Politechniki Warszawskiej, 2008</li> </ol>  |                               |
|  | Supplementary literature | <ol style="list-style-type: none"> <li>1. Rozporządzenie Ministra Infrastruktury z dnia 2 września 2004 w sprawie szczegółowego zakresu i formy dokumentacji projektowej, specyfikacji technicznych wykonania i odbioru robót budowlanych oraz programu funkcjonalno użytkowego. Dziennik Ustaw 202/2004.</li> <li>2. PN-ENV1046: Systemy z tworzyw sztucznych. Systemy do przesyłania wody i ścieków na zewnątrz konstrukcji budowli. Praktyczne zalecenia układania przewodów pod ziemią i nad ziemią</li> <li>3. Rozporządzenie Ministra Infrastruktury z dnia 3 lipca 2003 w sprawie szczegółowego zakresu i formy projektu budowlanego. Dziennik Ustaw 120/2003</li> <li>4. PN-EN805 Zaopatrzenie w wodę. Wymagania dotyczące systemów zewnętrznych i ich części składowych."</li> <li>5. Ustawa z dnia 7 czerwca 2001 r. o zbiorowym zaopatrzeniu w wodę i zbiorowym odprowadzaniu ścieków z późniejszymi zmianami, DU 72/2001</li> </ol> |                               |
|  | eResources addresses     | Adresy na platformie eNauczanie:  |                               |
| Example issues/<br>example questions/<br>tasks being completed |                          |   |                               |
| Work placement   | Not applicable           |   |                               |