



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basics of water resources management [S1ETI2>PGZW]

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### Course

Field of study

Education in Technology and Informatics

Year/Semester

3/5

Area of study (specialization)

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Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

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### Number of hours

Lecture

15

Laboratory classes

0

Other

0

Tutorials

15

Projects/seminars

0

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### Number of credit points

2,00

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### Coordinators

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### Lecturers

### Prerequisites

Basic knowledge of chemistry, physics, biology, geography and mathematics (mainly statistics), computer science. Knowledge of the basics of mathematical optimization. Awareness of the need to constantly update and supplement knowledge and skills.

### Course objective

Providing basic knowledge on water resources management in the world and in Poland. Presentation of the problem of water demand balance, water deficit and its effects. Showing water supply systems as an important element of critical infrastructure of countries.

### Course-related learning outcomes

Knowledge:

The student has knowledge about the structure of water resources in the world, in Europe and in Poland, knows the concepts of water demand and the effects of water deficits. The student knows the components of the water supply system and its functions, has knowledge of legal acts regulating water demand in Poland and Europe. Is able to identify water supply systems as elements of critical infrastructure of cities and countries, knows the concept of a Water Safety Plan based on risk analysis

tools

Skills:

The student is able to identify water supply system objects in their environment and knows their functions. Is able to distinguish between the concepts of water demand and water footprint. Is aware of the factors that shape the quality of water in their household

Social competences:

1. The student understands the need to work in interdisciplinary teams working on solving theoretical and practical problems related to water supply.
2. The student realizes the importance of tasks related to optimal water management.
3. The student recognizes the need to systematically deepen knowledge and expand their competences

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The lecture ends with a written test consisting of 16 questions, a combination of open, closed and test questions. Duration of the test: 60 minutes. The condition for passing the subject is to obtain at least 50% of the points from the test.

### Programme content

The program content will present basic issues related to water resource management in Poland, Europe and the world. Various types of water intakes and the construction and functions of water supply systems will be discussed. The classes will also present IT tools used in the design and optimization of water supply systems and risk analysis tools for managing the quality and safety of water supplies. All program content will be presented against the background of applicable legal regulations.

### Course topics

1. World water resources balance, Poland as a country with one of the largest water deficits in Europe. World water conflicts over the centuries.
2. History of the creation of collective water supply systems in the world and in Poland.
3. Types of water intakes for collective water supply purposes. Surface, underground and infiltration intakes.
4. Specific features of a given type of water taken and unit processes used to treat them.
5. Construction and functions of the collective water supply system. System configurations, depending on the terrain, engineering structures on the network, materials used and elements of the water supply network equipment. Hydraulic conditions in the network - maximum and minimum pressure, water retention time in the network, speeds.
6. Balance of water demand in the settlement unit. Groups of water recipients, water demand indicators.
7. Construction of hydraulic models of the water supply network and the possibilities of their use in optimizing the operation of the water supply system. Modeling water quality using IT tools. Data collection and archiving - SCADA system.
8. Legal acts regulating water supply issues in Poland, the European Union and the world. Supervision of water quality in accordance with the guidelines of the new Directive of the European Parliament and of the Council on the quality of drinking water. A new approach to supervision of water quality. Scope of monitored parameters.
9. Factors shaping water quality in water supply systems. The concept of water corrosiveness, chemical and biological stability and their impact on water quality for consumers.
10. Water Safety Plans, in accordance with WHO guidelines. The concept of toxic dose in relation to pollutants found in water.
11. Risk analysis of adverse events and tools used to perform analyses.
12. Water supply system as an element of critical infrastructure of cities.

### Teaching methods

Lecture using a multimedia presentation, combined with a discussion with the audience.

### Bibliography

Basic:

1. Suligowski Z., Zaopatrzenie w wodę, Wydawnictwo Seidel-Przywecki sp. z o.o., 2014
2. Mielcarzewicz E., Obliczanie systemów zaopatrzenia w wodę, Arkady, Warszawa 2001.
3. Knapik K., Bajer J., Wodociągi, Politechnika Krakowska, 2011

Additional:

1. Kowalczak P., Konflikty o wodę, Wydawnictwo Kurpisz S.A., 2007

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	55	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00