COURSE DESCRIPTION CARD - SYLLABUS

Course name

Water supply

Course

Field of study

Environmental Engineering Extramural First

Year/Semester

3/5

Area of study (specialization)

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

part-time

Requirements

compulsory

Number of hours

Lecture

12

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

18

Number of credit points

5

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

Prerequisites

Fluid mechanics: Knowledge of physical quantities characterizing fluids, units, basic and concepts and laws describing water flows in pipes, knowledge of measurement methods for these quantities. Knowledge of equations describing these phenomena understands the causes of hydraulic shocks and cavitation and knows the laws used to describe them.

Mathematics: Knowledge of the basics of formulation and methods of solving systems of linear and nonlinear algebraic equations. Basic knowledge of mathematical optimization.

Search for extremes of functions. Solving tasks of hydraulic calculations of pipelines cooperating with tanks and pumps, solving equations and systems of linear and nonlinear algebraic equations, measurements of hydraulic parameters, selection of measuring devices.

Knowledge gained in the 4th semester on the subject of Water Supply.

Awareness of the need to constantly update and supplement knowledge and skills.

Course objective

Transfer of basic knowledge, skills in the field of planning, design and operation of equipment and technological operations related to the collection, storage and transport of water from intakes to the treatment station and from the treatment station to home connections supplying water supply installations

Course-related learning outcomes

Knowledge

1. Student has knowledge of the structure of water intake and distribution systems in water supply systems. The student knows the functions, types and features of devices constituting technological systems in the system.

2. The student knows the basic, techniques, tools needed to solve engineering tasks in the field of construction and maintenance of equipment in water intake and distribution systems. The student knows the rules for designing vertical wells. Pump and siphon systems transporting water from vertical wells to treatment plants, principles of selection and dimensioning of devices for these systems.

3. The student knows the methods of programming the development, design and operation of water supply systems and devices that are their elements. The student knows the standards characterizing the level of service, level of equipment maintenance. The student knows the next phases in the process of planning, design and construction of water supply systems and the requirements for the necessary project documentation. The student knows the technologies used in the construction of water supply networks. Trench and trenchless methods of laying and mounting cables. Principles of leakage testing and final acceptance.

Skills

1. Student is able to identify features, analyze working conditions and assess the technical condition of exploited technological systems used for water intake.

2. Student is able to formulate and solve tasks of selection and dimensioning of system components as part of their planning, design, construction, modernization and maintenance.

3. The student is able to plan and carry out experiments, including simulations, the working conditions of pipelines transporting water on intakes and in water supply networks, their cooperation with other systems constituting the water supply system.

4. Student, formulating and solving engineering tasks, is able to see systemic aspects, economic and legal conditions of planning, designing and maintenance of devices.

Social competences

1. The student understands the need for teamwork in solving theoretical and practical problems.

2. Student realizes the importance of tasks related to optimal water management.

3. Student is able to identify socio-political conditions that may affect decisions taken in the management of water supply systems.

4. Student recognizes the need for systematic deepening of knowledge and extension of their competences.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

Written exam consisting of 15 questions, which are a combination of open, closed and test questions. Duration: 60 minutes. Maximum number of points to get: 50 points.

Grading scale:

0 ÷ 24.5 - (2.0)

25 ÷ 30 - (3.0)

30.5 ÷ 35 - (3.5)

35.5 ÷ 40 - (4.0)

40.5 ÷ 45 - (4.5)

45.5 ÷ 50– (5.0)

Project exercises

Checking progress in class, which is documented by entries in the consultation card.

Based on project exercise - the maximum number of points: 60 points.

Grading scale:

0 ÷ 29.5 - (2.0)

30 ÷ 36 - (3.0)

36.5 ÷ 42 - (3.5)

42.5 ÷ 48 - (4.0)

48.5 ÷ 54 - (4.5)

54.5 ÷ 60 - (5.0)

Programme content

Lecture:

Computer support in the design and operation of water intake and transport systems, Databases, spatial information systems. Computer models of systems. Operating principles of water distribution systems. Equipment renewal and modernization management. Prevention of secondary water pollution. Standards characterizing the level of equipment maintenance in water supply systems. Management of processes shaping water quality in water supply systems.

Project exercise:

Project topic: Program and spatial concept of the water distribution system

1. Calculation of water demand and working out the hourly distribution of water demand.

2. Planning the structure of the system and determining the useful volume of retention reservoirs.

3. Determination of nodal partitions.

4. Dimensioning of bus cable diameters.

5. Hydraulic calculations of the water supply network by the Cross-Łobaczew method

6. Plotting a pressure line graph.

7. Selection of pump aggregates

8. Development of the water supply network model using the Epanet program.

Teaching methods

Lecture: Lecture using multimedia presentation, combined with discussion with listeners.

Project exercises: project method using a multimedia presentation

Bibliography

Basic

1. Gabryszewski T., Wodociągi, Arkady, Warszawa, 1983

2. Suligowski Z., Zaopatrzenie w wodę, Wydawnictwo Seidel-Przywecki sp. z o.o., 2014

3. Mielcarzewicz E., Obliczanie systemów zaopatrzenia w wodę, Arkady, Warszawa 2001.

4. Knapik K., Bajer J., Wodociągi, Politechnika Krakowska, 2011

Additional

1. Clark R., Grayman W., Modeling Water Quality in Drinking Water Distribution Systems, AWWA, 1998

2. Guidlines for Drinking-water Quality, wydanie 4, WHO 2011

3. Lyp B., Strefy ochrony ujęć wód podziemnych, Wydawnictwo Seidel-Przywecki sp. z o.o., 2018

4. Kwietniewski M. i inni, Projektowanie elementów systemu zaopatrzenia w wodę, Wydawnictwo Politechniki Warszawskiej, Warszawa 1998

5. Pociask-Karteczka J., Zlewnia, właściwości i procesy, Wydawnictwo Uniwersytetu Jagiellońskiego, 2006

6. Rak J., Tchórzewska-Cieślak B., Ryzyko w eksploatacji systemów zbiorowego zaopatrzenia w wodę, Wydawnictwo Seidel-Przywecki sp. z o.o., 2013

7. Kowalski D., Nowe metody opisu struktur sieci wodociągowych do rozwiązywania problemów ich projektowania i eksploatacji, Monografia PAN, Lublin 2011

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation for exam, project preparation) [1]	95	4,0

[1] delete or add other activities as appropriate