



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Diagnostics of sanitary installations [N1IŚrod2>DIS]

Course

Field of study

Environmental Engineering

Year/Semester

4/7

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

part-time

Requirements

elective

Number of hours

Lecture

10

Laboratory classes

10

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

2,00

Coordinators

dr inż. Tomasz Kaźmierski

tomasz.kazmierski@put.poznan.pl

Lecturers

Prerequisites

1 Knowledge: Knowledge of technical solutions, operating principles and requirements for sanitary installations. 2. Skills: Knowledge of the construction and principle of operation of basic measuring equipment used in environmental engineering learned in laboratory classes in fluid mechanics, chemistry and biology. 3. Social Competencies: Ability to share one's skills with people in a group, understanding the need for continuous learning and supplementation of knowledge.

Course objective

- Ability to select the design and operating parameters of sanitary installations for assessing the correctness of their operation - Familiarization with basic measuring instruments and systems for measuring the operating parameters of sanitary installations - Familiarization with the methods of locating leaks and their repair options

Course-related learning outcomes

Knowledge:

1. Student knows the requirements for assessing the correct operation of sanitary installations
2. Student knows the basic parameters that characterize the correct operation of the installation

Skills:

1. Student is able to select and install equipment to measure the operating parameters of the plant that determine its proper operation

Social competences:

1. The student sees the need to systematically deepen and expand his competence.
2. The student understands the need for teamwork in solving theoretical and practical problems.
3. The student is aware of the consequences of exceeding his competence in decision-making.
4. The student is aware of the need to consult with experts.
5. Awareness that properly functioning sanitary installations bring satisfaction to their users, promote positive evaluation of engineering creations and contribute to environmental protection through reduced consumption of water, wastewater treatment agents and reduced energy consumption

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

A credit test on the entire subject matter discussed in lectures. A passing grade requires receiving at least 50% of the maximum number of points.

Laboratories:

Correct performance of the laboratories and obtaining positive grades from the so-called "input" and completed reports will enable to pass the course.

Programme content

Basic parameters for assessing the proper operation of water supply and sewage systems. Tests and requirements for installation components. Instruments used to measure and record pressure and flow in installations. Measurement of pressure and flow of water in domestic installations, multi-facility and industrial facilities. Leakage testing of water supply and sewage systems. Testing the energy efficiency of the pump and pumping systems. Endoscopic and TV camera inspections. Testing the pressure and capacity of hydrants. Measurements of pressure changes during hydraulic impacts. Measurements of noise levels.

Course topics

Lecture

Definitions: testing, diagnostics, measurement, measuring equipment, measurement uncertainty. Description of testing the water meter set and pumps. Description of barometers and liquid manometers. Measurement of flow rate, power, noise, pump lifting height. Permissible sound levels. Monitoring. Cavitation tests. Typical causes of pump failure. Installation tightness tests - general regulations. Tightness tests with cold and hot water and compressed air. Leak localization methods: acoustic, electroacoustic, tracer gas, thermography, noise correlation. Possibilities of repairing leaks. Equipment heights and approach diameters in accordance with standards. Inspection and maintenance of sanitary sewage systems. Manual and mechanical pushing. Visual inspection with an endoscope and a self-propelled camera. Fat separators. The effects of water hammer.

Laboratories

1. Examination with an endoscopic camera
2. Construction of a water meter set
3. Cavitation testing
4. Leak testing with thermography

Teaching methods

Lecture - lecture with the use of multimedia presentations with elements of a conversational and problem lecture, discussing a case study

Laboratories - method of experiment, practical exercise

Bibliography

Basic:

1. Chudzicki J., Sosnowski St.: Instalacje Wodociągowe , Wydawnictwo Seidel-Przywecki Sp. z o.o., Warszawa 2009
2. Chudzicki J, Sosnowski St.: Instalacje Kanalizacyjne , Wydawnictwo Seidel-Przywecki Sp. z o.o., Warszawa 2009
3. Barczyński A., Instalacje gazowe z miedzi Wyd. POLCEN, W-wa 1998
4. Świtalski P. ABC techniki pompowej. Wyd. ZPBiP CEDOS Sp. z o.o. Wrocław 2008

Additional:

Catalogs of measuring equipment companies3. KAŻMIERSKI T.: Pompy wirowe w systemach wodociągowych. // Wodociągi Kanalizacja. 2005, 9, s. 21-24

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	20	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00