STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Diagnostics and studies of sanitary systems**			Code **1010101271010135186**
Field of study **Environmental Engineering First-cycle Studies**	Profile of study (general academic, practical) **(brak)**		Year /Semester **4 / 7**
Elective path/specialty **-**	Subject offered in: **Polish**		Course (compulsory, elective) **elective**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **full-time**		
No. of hours Lecture: **15** Classes: **15** Laboratory: **-** Project/seminars: **15**			No. of credits **4**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**		
Education areas and fields of science and art **technical sciences**			ECTS distribution (number and %) **4 100%**

Responsible for subject / lecturer:

dr inż. Tomasz Kaźmierski
email: tomasz.kazmierski@put.poznan.pl
tel. 616652079
Faculty of Civil and Environmental Engineering
ul. Piotrowo 5 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge of technical solutions , principles and requirements for water , sewage and gas systems
2	**Skills**	Design and operation of basic measuring devices used in environmental engineering laboratory known during the course of fluid mechanics , chemistry and biology
3	**Social competencies**	Awareness of the need to constantly update and supplement knowledge based on industry literature , conference materials and the acquisition of skills in bringing it to the practice of engineering

Assumptions and objectives of the course:

Getting to know the requirements for water, sewage and gas systems in engineering knowledge

The ability to select design and operating parameters for the evaluation of sanitary installations for correct operation

Familiarize yourself with the basic instruments and measurement systems for measuring parameters of the water , sewage and gas systems

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. The student knows the requirements for assessing the operation of water, sewage and gas systems (obtained during lectures and exercises) - [[K_W02]]

2. The student knows the basic parameters characterizing the correct operation of an installation (obtained during lectures and exercises) - [[K_W05]]

Skills:

1. The student is able to choose and install a device for measuring the parameters of the installation determine its proper operation (gained on exercises and projects) - [[K-U08, K_U13, K_U15]]

Social competencies:

1. Awareness of the need to constantly update and supplement knowledge based on industry literature , conference materials and the acquisition of skills in bringing it to the practice of engineering (obtained during lectures, exercises and projects) - [[K_K02]]

Assessment methods of study outcomes

Passing the lecture and the auditorium exercises on the basis of a written test. Assignment of projects based on the project.
The part about the lecture is aimed at checking knowledge and consists in answering questions (effect K_W02, K_W05)
The section on auditing exercises consists in indicating the appropriate measuring equipment, the selection of its measuring ranges and the description of the method of installation in the facility (effect K_U08, K_U13, K_U15)

Evaluation criteria:
91 100 very good (A)
81 90 good plus (B)
71 80 good (C)
61 70 satisfactory plus (D)
51 60 satisfactory (E)
50 and below inadequate (F)

Course description

The lecture is conducted using the following methods: information lecture, problematic lecture, programmed text
Exercise is carried out using methods: exercise, situational
Projects are carried out using the method: project.

The basic parameters for the assessment of the proper operation of water and sewage systems
Research and requirements for system components
The instrument used for measuring and recording the pressure and flow in systems
Measurement of pressure and flow of water in water system of household ,multifamily and industrial buildings
Leak testing of water and sewage system
The study of energy efficiency pumps and pumping systems
Sewer Inspections TV
Pressure and flow test of hydrants
Measurements of pressure during the water hammer
Noise level measurements

Basic bibliography:

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. Switalski P. ABC techniki pompowej. Wyd. ZPBiP CEDOS Sp. z o.o. Wrocław 2008

Additional bibliography:

1. KAŹMIERSKI T.: Pompy wirowe w systemach wodociągowych. // Wodociągi ? Kanalizacja. ? 2005, 9, s. 21-24
2. BAGIEŃSKI J., CIEŚLAK M., KAŹMIERSKI T.: Indeks sprawności energetycznej pomp. // Pompy, pompownie. ? 2007, nr 2, s. 47-48
3. KAŹMIERSKI T.: Armatura systemów wodociągowych i kanalizacyjnych. // Wodociągi ? Kanalizacja. ? 2007, 5, s. 68-71
4. KAŹMIERSKI T.: Zasuwy i przepustnice. // Wodociągi ? Kanalizacja. ? 2007, 4, s. 48-50

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures (contact hours)	15
2. Participation in the exercises auditorium (contact hours)	15
3. Prepare to complete the course (working alone)	35
4. Participation in consultations related to tutorials and practical exercises (contact hours)	10
5. Participation in projects (contact hours, practical)	15

Student's workload

Source of workload	hours	ECTS
Total workload	100	4
Contact hours	55	3
Practical activities	15	1