STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Municipal Systems**		Code **1010135221010132026**
Field of study **Enviromental Engineering Extramural Second-**	Profile of study (general academic, practical) **(brak)**	Year /Semester **1 / 2**
Elective path/specialty **Water Suply, Water Soil Protection**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **part-time**	

No. of hours					No. of credits
Lecture: **16**	Classes: **12**	Laboratory: **-**	Project/seminars: **16**		**3**

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 %**)** **3 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of drinking water treatment, construction and operation of simple pumping systems, construction and operation of sanitation, basic knowledge of fluid mechanics.
2	**Skills**	Design of water treatment plants, pump selection and the necessary fittings in pump systems, solving pumping systems, design of sanitary hot and cold water, the use of fundamental rights, depending on the mechanics of liquids and gases.
3	**Social competencies**	Awareness of the need to constantly update and supplement knowledge and skills.

Assumptions and objectives of the course:

The acquisition by the students basic knowledge, skills in designing indoor swim public and private.

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

Knowledge:

1. Classification of swimming pools. (lectures) - [K2_W02, K2_W05, K2_W07]
2. Technological solutions of swimming pools. (lectures) - [K2_W05, K2_W07]
3. Functional systems indoor swimming pool. (lectures, classes) - [K2_W07]
4. Swimming pool water treatment. (lectures, classes) - [K2_W05, K2_W07]
5. Methods for disinfection of swimming pool water. (lectures, classes) - [K2_W05, K2_W07]
6. The quality requirements for pool water. (lectures) - [K2_W03, K2_W05]
7. Technological water systems in swimming pools. (lectures, classes) - [K2_W05, K2_W07]
8. Solutions swimming pools installations. (lectures, classes) - [K2_W05, K2_W07]
9. Adjust the water level in the pools without and with expansion tank. (lectures) - [K2_W07]
10. Sewage disposal technology. (lectures) - [K2_W07]
11. Cleaning and hygiene requirements in indoor swimming pools. (lectures) - [K2_W07]

Skills:

1. Selecting the right inside the pool for the application requirements. (classes, projects)   - [K2_U18, K2_U19]

2. Accepting the right solution of the swimming-pool. (classes, projects)   - [K2_U17, K2_U19]

3. Meeting the requirements of the installation and construction, as provided for individual rooms in a bathing establishment. (classes, projects)   - [K2_U16, K2_U19]

4. Designing a water treatment plant in the plant pool. (classes, projects)   - [K2_U15, K2_U19]

5. Designing a technological installation, supply and drain pool water into the basin and along the respective devices. (classes, projects)   - [K2_U14, K2_U19]

6. Determination of the heat demand for heating swimming pool water (heat balance). (classes, projects)   - [K2_U14, K2_U19]

7. Presentation of the user conduct for staff in the field of swimming pool cleaning and hygiene activities. (lectures)   - [K2_U04]

Social competencies:

1. The student understands the need for teamwork in solving theoretical and practical problems. (classes, projects) - [K2_K03]

2. The student sees the need for systematic deepening and extending their competence.(classes, projects) - [K2_K01, K2_K05]

3. The student is aware of the social role of technical university graduate.(classes, projects) - [K2_K07]

Assessment methods of study outcomes

Lectures (efekt: W02, W03, W05, W07):

- a written final test students' knowledge.

- pass - 50% points.

Tutorials (efekt: W03, W05, W07, U14, U15, U17, U18, U19):

- the accuracy of self-assessment tasks solutions,

- continuous assessment of the students (rewarding students activity),

- final test in the last week of the semester.

- pass - 50% points.

Projects (efekt: U14, U15, U17, U18, U19):

- assessment of the correctness of the project,

- the ocean of knowledge of the scope of the project,

- continuous assessment of the students (rewarding students activity).

- pass - 50% points.

Course description

Division of swimming pools (private, public and open, covered, with a variable cover).

Characteristics of indoor swimming pools (sports, swimming, for swimming, for non-swimmers, children, jumping, playing water polo, multi-tasking).

Technology workmanship and material troughs pools.

The quality of the water in the pool.

Systems for swimming pools (open, closed).

The functional indoor swimming pool: hygiene zone in the indoor swimming pool (dirty and clean), the basic functional groups of rooms in the plant pool (part of the overall team szatniowo spray, indoor swimming pool, heating room requirements for premises in swimming-pool

Pre-treatment of swimming pool water (requirements for catcher fibers and hairs).

Coagulation: definitions (coagulation, dispersion, colloid); types of coagulants; chemical reactions; recommended doses of coagulants; coagulant dosage conditions.

Filtration: The filtration process conditions; division of filters (non-pressure, pressure, vacuum); division filters depending on the type of filling (bed single layer, multilayer, diatomitowi enriched with activated carbon, high performance of plastic); requirements for flushing pressure filters; filtration characteristics deposits diatomaceous earth, diatomite filter stages of work.

Adjustment of the pH of pool water: causes and effects of changes in the pH of pool water; correctors pH (pH minus measures and measures pH plus); with dosing recommendations equalizer pH; chemical reactions associated with the pH adjusted with sodium carbonate

Disinfection of pool water.

Ozone treatment of swimming pool water.

Disinfection of pool water by UV rays.

Technological water systems in pools: the flow of water in the basin (requirements for the proper flow of water through the basin); water exchange systems in the basin (horizontal, vertical, horizontal-vertical); means for supplying water to the basin; means for discharging water from the basin; transfers (point, line); other drains water from the basin; steady inflow and outflow of water from the basin (symmetrical splitter, splitter simple, linear transfer from gutters); tank overflow (overflow tank tasks, open the overflow tank volume); Fresh make-up water (water losses in circulation pool, adding fresh makeup water, filling times of the swimming pool).

Adjust the water level in the expansion tank basins: structure and tasks of the regulator.

Adjust the water level in the pools without expansion tank: mechanical and electronic water level controller.

Solutions swimming pool installation: the installation of swimming pool skimmers (recommendations or requirements), installation of swimming pool gutter (recommendations or requirements).

Discharge process wastewater basin: the type of waste water and place the drain.

Cleaning and hygiene requirements in indoor swimming pools.

Basic bibliography:

1. Sokołowski Cz.: Wymagania sanitarno-higieniczne dla krytych pływalni; PZITS, Warszawa 1998

2. Madeyski A.: Baseny kąpielowe-lecznicze i rehabilitacyjne; PZITS, Warszawa 1984r

3. Kappler H. P.: Baseny kąpielowe; Arkady, Warszawa 1977

4. Jaskólski M., Mickiewicz Z.: Wentylacja i klimatyzacja hal krytych pływalni, IPPU MASTA, Gdańsk 2000

5. Sokołowski Cz.: Wymagania sanitarno-higieniczne dla krytych pływalni; PZITS, Warszawa 1998

6. Madeyski A.: Baseny kąpielowe-lecznicze i rehabilitacyjne; PZITS, Warszawa 1984r

7. Kappler H. P.: Baseny kąpielowe; Arkady, Warszawa 1977

8. Jaskólski M., Mickiewicz Z.: Wentylacja i klimatyzacja hal krytych pływalni, IPPU MASTA, Gdańsk 2000

Additional bibliography:

1. Instalacje basenowe; II Sympozjum Naukowo-Techniczne, Ustroń 1999
2. Instalacje basenowe; III Sympozjum Naukowo-Techniczne, Ustroń 2001
3. Instalacje basenowe; IV Sympozjum Naukowo-Techniczne, Ustroń 2003
4. Instalacje basenowe; V Sympozjum Naukowo-Techniczne, Ustroń 2005
5. Instalacje basenowe; VI Sympozjum Naukowo-Techniczne, Ustroń 2007
6. Instalacje basenowe; VII Sympozjum Naukowo-Techniczne, Ustroń 2009
7. Instalacje basenowe; VIII Sympozjum Naukowo-Techniczne, Ustroń 2011
8. Instalacje basenowe; II Sympozjum Naukowo-Techniczne, Ustroń 1999
9. Instalacje basenowe; III Sympozjum Naukowo-Techniczne, Ustroń 2001
10. Instalacje basenowe; IV Sympozjum Naukowo-Techniczne, Ustroń 2003
11. Instalacje basenowe; V Sympozjum Naukowo-Techniczne, Ustroń 2005
12. Instalacje basenowe; VI Sympozjum Naukowo-Techniczne, Ustroń 2007
13. Instalacje basenowe; VII Sympozjum Naukowo-Techniczne, Ustroń 2009
14. Instalacje basenowe; VIII Sympozjum Naukowo-Techniczne, Ustroń 2011

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures (contact hours)	16
2. Participation in the project activities (contact, practical hours)	16
3. Participation in tutorials (contact hours)	12
4. Participation in consultations related to the implementation of the project and tutorials (contact, practical hours)	3
5. Implementation of project activities (practical hours, independent work)	8
6. Preparation for the final test of tutorials and projects (independent work)	18
7. Absence from completing the exercise and defense of the project (contact hours)	2

Student's workload

Source of workload	hours	ECTS
Total workload	75	3
Contact hours	49	2
Practical activities	27	1

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