

Course name **Sanitary Systems and Installations** Code Credit points **4**

Language of instruction **English**

Programme Intelligent Energy (IE), Biotechnology for Environmental Protection (BI),

Type of studies BSc

Unit running the programme Faculty of Environmental Protection and Engineering  
Institute of Environmental Engineering

Course coordinator and academic teachers Maciej Mrowiec, PhD  
Robert Malmur, PhD

Form of classes and number of hours

Semester	Lec.	Tut.	Lab.	Proj.	Sem.	Credit points
V	30	15		15		4

Learning outcomes Understanding of the treatment processes for water and wastewater. Design of the water distribution systems and the treatment devices. Design of wastewaters (both :sanitary and stormwater) conveyance and treatment systems.

Prerequisites *Hydrology, Applied Hydraulics*

Course description

**LECTURES:**

Water supply systems. Water intakes. Storage reservoirs. Pumping stations. Water pipe networks – types, hydraulic design. Materials used to construct the water supply systems. Structural design and construction. Location of the water pipes and their equipment. Legal requirements and hydraulic tests needed to finish the construction works. Operation and maintenance.

Drainage systems. Classification of wastewaters and the sewer systems. Pressure and vacuum sewer systems – the range of application.. Hydraulic design of sewer pipes. Materials used to construct the sewer systems. Pumping station design. Location of the sewer pipes in the cross-section of typical streets. Sewer outfalls. Legal requirements and tests needed to finish the construction works of the sewer system. Operation and maintenance of urban sewer systems.

Gas installations and internal sanitary systems – materials, armature. Pipes installed underground and aboveground – environmental impact assessment during construction, operation and emergency situation.

**TUTORIALS:**

Hydraulic calculations of the water distribution system, including storage reservoirs. Estimation of the flows during dry weather and wet weather into sanitary and stormwater sewers. Design a small system in a real setting, based on their understanding of physical principles and real constraints such as minimum velocity, slope and cover.

**LABORATORY:**

**PROJECT:**

Project of small-scale water and sewage (sanitary and stormwater) systems. Application of the current software to the design of small-scale water distribution, storm water and sanitary sewer systems.

**SEMINAR:***Form of assessment**Basic reference materials*

1. Butler D., Davies J.W. (2000), Urban drainage. E & FN Spon, London.
2. Durrans T. (2002) Stormwater Conveyance Modeling and Design, Haestad Press.
3. Walski T., (2003), Advanced Water Distribution Modeling And Management, Haestad Press.
4. Gribbin J., (2001), Introduction to Hydraulics & Hydrology: With Applications for Stormwater Management, Delmar Learning.
5. Swamee P., Sharma A., (2008), Design of Water Supply Pipe Networks, Wiley-Interscience.

*Other reference materials*

1. Mielcarzewicz E., (2001), Obliczenia systemów zaopatrzenia w wodę, Arkady.
2. Błaszczyk W, Stamatello H, Błaszczyk P. (1983), Kanalizacja. Sieci i pompownie, Tom 1, Arkady.
3. Roman M. (1991), Wodociągi i kanalizacja. Podstawy projektowania i eksploatacja. Arkady, Warszawa.
4. Imhoff K. R. (1996), Kanalizacja miast i oczyszczanie ścieków. Oficyna Wydawnicza Projprzem – EKO.
5. Chudzicki J., Sosnowski S, (2006), Instalacje wodociągowe, projektowanie wykonywanie, eksploatacje, Wydawnictwo Seidel – Przywecki.

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Average student workload (teaching hours + individ.)	
Remarks:	
Updated on:	