COURSE DESCRIPTION CARD - SYLLABUS

Course name
Severage Systems [N2IŚrod2-ZwWOWiG>SK]

Course

Field of study
Environmental Engineering

Year/Semester
1/2

Area of study (specialization)
Water Supply, Water and Soil Protection

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
10

Laboratory classes
0

Other
0

Tutorials
18

Projects/seminars
18

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge acquired within courses delivered earlier during First-cycle studies: Fluid Mechanics, Sewerage Systems, Water management with meteorology. Self-education ability and awareness of the need to constantly update and supplement knowledge and skills.

Course objective

Widening and deepening of knowledge and skills acquired in the first-cycle studies required for solution of complex engineering problems concerning wastewater and stormwater disposal.

Course-related learning outcomes

Knowledge:
1. Student knows the method of rainfall data processing including total and effective rainfall hyetographs evaluation.
2. Student knows basic relations of de Saint-Venant model and algorithm of rainfall-runoff computations.
3. Student knows methods of dimensioning of selected storm sewer system components.
4. Student has knowledge of aims of BMP (Best Management Practices) and methods applied for their

achievement.
5. Student knows principles of creating sewarage system monitoring network.

Skills:
1. Student can create simulation model of storm sewer system with the use of SWMM.
2. Student can perform dimensioning of sewer networks components of special purposes with the use of Epanet anf SWMM.
3. Student can apply BMP for reduction of runoff.
4. Student can assess fulfillment of requirements for drainage systems according to PN-EN 752.

Social competences:
1. The student sees the need for systematic incresing his skills and competences.
2. The student understands the need for teamwork in solving theoretical and practical problems.
3. The student is aware of the consequences of crossing his competences when deciding.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures:
Written final exam (4-5 questions to answer)
The grading scale - grade (the percentage of points): ndst (0-50), dst (51-60), dst+ (61-70), db (71-80), db+ 81-90), bdb (91-100)
Classes:
Written test (multiple choice test, 20 questions)
The grading scale - grade (the percentage of points): ndst (0-50), dst (51-60), dst+ (61-70), db (71-80), db+ (81-90), bdb (91-100)
Projects:
The final grade is arithmetic mean of two grades for project and analysis of sewage pump station made with the use of Epanet and project of sewerage systems for urban catchment made with the use of SWMM
Each project was evaluated on basis of following criteria: correctness of accepted assumptions and calculation methods, correctness of calculations and draws, edition of the project and student engagement. Final grade is arithmetic mean of grades obtained for each criteria (criteria were evaluated with the scale from 1 to 5).
The grading scale - grade (points): ndst (0,00-2,50), dst (2,51-3,25), dst+ (3,26-3,75), db (3,76-4,25), db+ (4,26-4,75), bdb (4,76-5,00)

Programme content

Rainfall-runoff transformation.
Hydrodynamic modeling of stormwater runoff.
Creation and operation of sewage network models.
Monitoring of sewerage system.
Modeling of sewage pumping stations.

Course topics

Lectures:
Modeling runoff from urban catchments (de Saint-Venant equations, application of simulation models)
Rainfall-runoff transformation in urban areas (surface runoff models - linear reservoir and nonlinear reservoir, hydrological losses)
Effective rainfall calculations with SCS method
Monitoring of sewerage system (outflow measurements, rainfall measurements, gauging points localization)
Calibration of simulation models (aims, methods, assessment of model fitting)
Classes:
Computer programs for sewerage systems calculations (SWMM and EPANET)
Synthetic hyetographs (application, types)
Rainwater harvesting in urban catchments (review of solutions, basic rules of dimensioning)
Projects:

Usage of simulation programs for sewerage systems designing and analyzing (project of sewerage systems for urban catchment made with the use of SWMM and project and analysis of wastewater pumping station made with the use of EPANET)

Teaching methods

Lecture with the use of multimedia presentation and the elements of seminar lecture and problem-focused lecture.
Classes based on training method completed by visual cases study and classic lecture (with multimedia presentation) .
Project with the design method completed by a lecture with multimedia presentation.

Bibliography

Basic:
1. Kotowski A. Podstawy bezpiecznego wymiarowania odwodnień terenów, tom I i II, Wyd. Seidel-Przywecki, 2015
2. Słyś D. Retencja i infiltracja wód deszczowych. Oficyna Wyd. Politechniki Rzeszowskiej, 2008
3. Bolt A., Suligowski Z. Kanalizacja- projektowanie, wykonanie, eksploatacja. Seidel-Przywecki, 2012
4. Weismann D.: Komunalne przepompownie ścieków, Wyd. Seidel-Przywecki, 2001

Additional:
1. Mrowiec M. : Efektywne wymiarowanie i dynamiczna regulacja kanalizacyjnych zbiorników retencyjnych, Wydawnictwo Politechniki Częstochowskiej, 2009
2. Dąbrowski W.: Oddziaływania sieci kanalizacyjnych na środowisko, Wydawnictwo Politechniki Krakowskiej, 2004
3. Kuliczkowski A.: Technologie bezwykopowe w inżynierii środowiska, Seidel-Przywecki, 2010
4. Królikowska J.: Niezawodność funkcjonowania i bezpieczeństwo sieci kanalizacyjnej, Seidel-Przywecki, 2010
5. Mazurkiewicz K., Skotnicki M, Dymaczewski Z: Duration of a Design Rainfall for Urban Drainage System Modelling , Rocznik Ochrona Środowiska - 2020, vol. 22, no. 2, s. 892-904
6. Mazurkiewicz K., Skotnicki M, Dymaczewski Z: Effective impervious area mapping in modeling runoff from urban catchment, Rocznik Ochrona Środowiska - 2020, vol. 22, no. 1, s. 417-430
7. Mrowiec M.: Retencja wód opadowych w obszarach zurbanizowanych, Wydawnictwo Politechniki Częstochowskiej, 2020

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	46	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	79	3,00