

MODULE INFORMATION SHEET

Name of Module Unit	Hydrology of urban areas
Name in polish language	Hydrologia terenów zurbanizowanych
Module type	compulsory / elective
Form of studying	full-time day courses
Level of study	undergraduate course (B.Sc. level)
Type of study (for extra-mural courses)	-
Programme	Environmental Engineering
Speciality	Environmental Engineering
Responsible department	Hydro-engineering and Hydraulics Department
Responsible person	Paweł Falaciński, D.Sc., PhD Eng. Agnieszka Machowska, PhD Eng.

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
6	15				30	3

Objectives (summary)

Student is able to recognize basic methods of hydraulic loads estimation for dewatering systems, conditions of freshet and flood forming, water filtration in the ground.

Prerequisites

1. Fluid Mechanics
2. Hydrology
3. Meteorology

Rules for integrated grade definition

Maximum number of students in a project group is 15.
Completing of the project.
Lectures are followed by the written test.

Recommended readings

1. Edel R.: *Odwodnienie dróg*. WKiŁ, Warszawa, 2000.
2. Geiger W., Dreiseitl H.: *Nowe sposoby odprowadzania wód deszczowych. Poradnik*. Oficyna Wydawnicza Projprzem-EKO, Bydgoszcz, 1999.
3. Highlands Ranch: United States Soil Conservation Service, 1987.
4. Shaw E. M.: *Hydrology in practice*. Chapman and Hall, 1993.
5. Ram S. Gupta: *Hydrology and hydraulic ststems*. Hardcover 2008.
6. PN-S-02204. *Drogi samochodowe. Odwodnienie dróg*.
7. Viessman and others: *Introduction to hydrology*. 3rd edition, HarperCollins Publishers 1989.
8. Ciepielowski, Sz. L. Dąbkowski: *Metody obliczeń przepływów maksymalnych w małych zlewniach rzecznych*. Oficyna Wydawnicza Projprzem-EKO, Bydgoszcz 2006

Contents of lectures (syllabus)

	Topics	Time (hrs.)	Scope (S / Ex)
1.	Basic issues: water-ground environment, types of drainage areas/catchments, physical characteristics of urban drainage areas.	2	S
2.	Rainfall – types, magnitude, rate, rate's variation, distribution, rainfall receivers.	2	
3.	Run-off – types, factors, disturbances, variation, run-off coefficients, run-off lag coefficient.	2	
4.	Rainfall freshet – characteristics, forming of culmination, freshet wave movement, modelling of the reach of backwater.	2	
5.	Role of retention of drainage area in rainfall freshet forming.	2	
6.	Groundwaters – movement, landfill inundation, natural and affected causes of inundation.	2	
7.	Basics of dewatering systems dimensioning – run-off quantity method, intensity constant's method, limiting intensity method, lag coefficient method, variable run-off coefficient method.	3	
Total		15	hours

S – topics listed in the legal study programme standards from 12.07.2007

Ex – extended topics

Lecturers

D. Sc., PhD Eng. Paweł Falaciński, PhD Eng. Agnieszka Machowska

Assessment method

Lectures are followed by the written test.

Contents of guided projects

	Topics	Time (hrs.)	Scope (S / Ex)
1.	Use of available formulas of the time of concentration.	2	S
2.	Valuation the reliable rain intensity – use of available formulas.	2	S
3.	Calculate the peak discharge. Calculation on the example urban drainage areas.	4	S/Ex
4.	Calculate the rainwater receiver. Hydraulic calculation of discharge pipes.	4	S
5.	Project of the intake of rainwater from mixed drainage area (including built-up areas) and directing it through the storage reservoir to the receiver. The project is based on contour map.	18	S
Total		30	hours

S – topics listed in the legal study programme standards from 12.07.2007

Ex – extended topics

Persons responsible for guided projects

D.Sc., PhD Eng. Paweł Falaciński, PhD Eng. Agnieszka Machowska

Assessment method for guided projects

Defence of the project.