MODULE INFORMATION SHEET

Name of Module Unit	**Irrigation and Drainage**
Name in polish language	
Module type	compulsory / ~~elective~~
Form of studying	full-time day courses
Level of study	graduate course (M.Sc. level)
Type of study (for extra-mural courses)	-
Programme	Environmental Engineering
Speciality	Environment Protection Engineering
Responsible department	Chair of Environmental Protection and Management
Responsible person	dr hab inż. Mirosław Szyłak-Szydłowski

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
2	15				30	3

Learning outcomes (knowledge, skills, competences)

Students will acquire **knowledge** of methods and technology used in irrigation and drainage, for example, of waste management facilities. Moreover, they will learn how to design systems to counteract the spread of contaminations with landfill leachates. Students will acquire **skill** of design of system of leachate's drainage. They can determine of amount of leachates and water balance of the landfill as well as the dimensions of the reservoir. Students, working in teams, will acquire social **competences** – they develop project regardless of the rights and they will have to demonstrate their creativity and ability to expand their knowledge.

Prerequisites

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Rules for integrated grade setting

Lectures: 55% (test), project: 45% (defence of the project)

Recommended readings

1. Edel – Odwadnianie dróg
2. Butler – Urban drainage
3. Garbulewski – Dobór i badanie gruntowych uszczelnień składowisk odpadów komunalnych
4. Zadroga, Olańczuk-Neyman – Rekultywacja podłoża gruntowego
5. Żakowicz, Hewelke, Gnatowski - Podstawy infrastruktury technicznej w przestrzeni rolniczej
6. Powers - Construction dewatering and groundwater control: new methods and applications
7. Design manual: dewatering municipal wastewater sludges

Contents of lectures (syllabus)

	Topics	**Time** (hrs.)	**Scope** (S / Ex)
1	Principles, methods and tasks of irrigation and drainage.	4	S
2	Hydrologic, hydraulic and ground-water parameters, included in the irrigation and drainage processes.	2	S
3	Causes of flooding and water scarcity - the environmental hazards.	2	S
4	The main tasks of drainage meliorations.	2	S
5	Principles of usage of irrigation meliorations.	2	S
6	Types of liners used in landfills, geosynthetic materials.	3	S
	Total	**15**	**hours**

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

Lecturers

Mirosław Szyłak-Szydłowski, Ph.D, D.Sc.

Assessment method

Exam

Contents of guided projects

	Topics	**Time** (hrs.)	**Scope** (S / Ex)
1	Determination of amount of leachates and water balance of the landfill.	6	S
2	Design of system of leachate's drainage.	6	S
3	Development of guidelines for exploitation of the landfill drainage basin.	6	S
4	Determination of dimensions of the reservoir.	6	S
5	Irrigation of given farmland.	6	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

Mirosław Szyłak-Szydłowski, Ph.D, D.Sc.

Assessment method for guided projects

Defense of two project tasks