

## MODULE INFORMATION SHEET

<b>Name of Module Unit</b>	<b>Integrated Water Resources Management</b>
Name in Polish language	Zintegrowane gospodarowanie wodami
Module type	compulsory / <del>elective</del>
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	Chair of Environmental Protection and Management
Responsible person	dr inż. Dorota Pusłowska-Tyszewska

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
6	15 (Exam)				30	5

### Objectives (summary)

The main purpose of the course is to introduce students to contemporary problems of water management, with special focus on integrated approach to natural and human systems within catchment boundaries. During the course the students become acquainted with structural and non-structural measures, operating principles of hydrotechnical structures and close-to-nature solutions, including restoration and protection of water dependent ecosystems. They learn the methods applied in developing water management solutions, like interdisciplinary approach, simulation techniques and multi-objective analysis. Moreover, students become familiar with the legal framework for protection of water resources as well as aquatic and water dependent ecosystems and flood risk management which is valid in the EU.

### Prerequisites

Environmental Protection, Hydrology, Meteorology, Engineering Hydrology, Informatics

### Rules for integrated grade definition

$0.6*L + 0.4*P$

### Recommended readings

Daniel P. Loucks and Eelco van Beek, 2017: Water Resources Systems Planning and Management - An Introduction to Methods, Models and Applications. Deltares and UNESCO-IHE. Springer International Publishing 2017.  
 DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy, Official Journal of the European Communities, 22.12.2000  
 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A Blueprint to Safeguard Europe's Water Resources. COM(2012) 673 final, Brussels, 14.11.2012

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2007 on the assessment and management of flood risks, Official Journal of the European Communities, 6.11.2007  
 Guidance document on the application of water balances for supporting the implementation of the WFD – Draft  
<http://www.gwp.org/ToolBox/>

## Contents of lectures (syllabus)

No.	Topics	Time (hrs.)	Scope (S / Ex)
1	Basics: water management (WM) definition, characteristics of contemporary water management: needs for integration, sustainability and public participation; integrated river basin management (IWRM)	1	S
2	WM goals and tasks. Systemic approach in WM: 1) water resources, water demands and tasks, WM measures, assessment criteria; 2) procedures of solving problems – alternative/scenario analyses	1	S
3	Systemic approach. Example of water supply issue: 1) basic definitions – available resources, environmental flow, water demand, intake and deficit, time and volume reliability; 2) simulation analyses; 3) alternatives – resource management, demand management; 4) rules for assessing parameters of technical structures (volume of storage reservoir, capacity of transfer channel)	3	S
4	Storage reservoirs: classification, technical aspects, operation rules for water supply and flood protection tasks, environmental impact of storage reservoirs	2	S
5	Environmental flow concept and methods	2	
6	Flood protection task, technical (dikes, polders, dry reservoirs) and non-technical measures	2	S
7	Natural water retention measures	1	Ex
8	Role of ecosystem services; economic aspect of ecosystem services	1	Ex
9	The EU legislation in WM: Water Framework Directive (environmental objectives, River Basin Management Plans, programme of measures) and Flood Directive (flood risk assessment).	2	Ex
<b>Total</b>		<b>15</b>	<b>hours</b>

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

Ex – extended topics

### Lecturers

dr inż. Dorota Pusłowska-Tyszewska

### Assessment method

Exam

## Contents of guided projects

No.	Topics	Time (hrs.)	Scope (S / Ex)
1	Anthropogenic impacts on water resources	3	S
2	Municipal and irrigation water demands	4	S
3	Simulation of water management in storage reservoir according to standard policy operation rule	4	S
4	Computation of required release for several water users (water reuse issue)	2	S
5	Simulation of water management in flood protection volume of storage reservoir (rigid and semi-rigid policy)	2	S
6	Hydrological profile	2	S
7	Problem of an industrial plant water supply: construction of storage reservoir and demand reduction. Project includes: development of a simulation model of the WM system, determining of possible alternatives and choosing the best one according to economic criterion	9	Ex
8	Review of selected water management problems	4	Ex
<b>Total</b>		<b>30</b>	<b>hours</b>

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

Ex – extended topics

### Persons responsible for guided projects

dr inż. Dorota Puśłowska-Tyszewska

### Assessment method for guided projects

Continuous assessment. Assessment of individual projects and water management problem presentation