



Water Resources Management Curricula in the WB: Experiences and Good Practices

Panagiotis Prinos, Professor, Dept of Civil Eng., AUTH, Greece,
prinosp@civil.auth.gr

Merima Salčin, Senior assistant, Faculty of Civil Eng., UNMO, B&H,
merima.salcin@unmo.ba

SWARM, Final Conference , Strengthening of master curricula in water resources management for the Western Balkans HEIs and stakeholders
Podgorica, Montenegro, 31 March-1 April 2022



1. Basic Requirements in Civil Engineering Education
2. Strengthening Water Engineering and WRM curricula
3. Development of Water Engineering and WRM courses in HEIs in WB
4. Good Practices
5. Conclusions

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1. Basic Requirements in Civil Engineering Education

Courses in Basic Sciences (Mathematics, Physics, Computing)
Compulsory courses in Civil Engineering (Structural, Geotechnical, Hydraulics,
Environment, Transportation, Construction Management)
Elective courses in each specialization, based on professional activities

Use of Textbooks , especially in courses providing fundamental concepts and physical laws

Laboratory, Computing and Practical Experience of students

Diploma Thesis- Research oriented



2. Strengthening Water Engineering and WRM curricula

Courses in all aspects of Water Engineering (Hydraulics, Hydrology, Water Resources, Coasts/Sea/Ports, Environment)

Interdisciplinary Courses (e.g Dams, Natural Hazards (Floods, Landslides and Earthquakes)

Project-based courses applying methods used in practice and new computational techniques (free computer codes, open source codes)

Technical Science or Engineering Courses ????? The significance of construction methods

3. Development of Water Engineering and WRM courses in HEIs in WB



University of Montenegro

Faculty of Civil Engineering: the Bachelor, Master and Doctoral Study Programs are organized according to the system of (3+2+3) years.

Bachelor programme: CIVIL ENGINEERING (3 years/6 semesters)

Existing courses related to WRM:
Basics of Hydraulics Engineering

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3. Development of Water Engineering and WRM courses in HEIs in WB

University of Montenegro

Master programme: CIVIL ENGINEERING MASTER – STUDY PROGRAMME INFRASTRUCTURE (2 years/4 semesters)

Name of the subject	Sem.	The number of classes			No. ECTS
		L	E	LB	
FIRST YEAR					
I - COMMON SEMESTER					
1. ENGINEERING GEOLOGY	I	2	1	1	5
2. PROJECT MANAGEMENT	I	2	1	1	5
3. ENGINEERING GEOLOGY	I	2	1	1	5
4. ENGINEERING HYDRAULICS	I	2	1	1	5
5. HYDROLOGY	I	2	1	1	5
6. MANAGEMENT IN CIVIL ENGINEERING	I	3	1	1	5
Total of active teaching		13	6	6	30
Total of ECTS credits					30
MODULE 2 WATER ENGINEERING – II – SEMESTER					
1. ENGINEERING HYDROLOGY	II	2	1	1	5
2. HYDRAULIC STRUCTURES	II	2	1	1	5
3. MUNICIPAL HYDROTECHNICS	II	3	1	1	5
4. WATER PROTECTION AND QUALITY	II	2	1	1	5
5. RIVER REGULATION	II	2	1	1	5
6. MODELING IN HYDRAULIC ENGINEERING	II	3	0	3	5
Total of active teaching		12	5	8	30
Total of ECTS credits					30
SECOND YEAR					
MODULE 2 WATER ENGINEERING – III – SEMESTER					
1. WATER TREATMENT	III	2	1	1	5
2. MEASUREMENTS IN HYDROTHETICS	III	2	1	1	5
3. USE OF WATER POWER	III	2	1	1	6
4. DRAINAGE AND IRRIGATION	III	2	1	1	5
5. PORTS AND HARBORS	III	2	1	0	4
6. HYDRAULIC OF GROUNDWATERS	III	3	1	1	5
7. MASTER'S THESIS	IV	13	6	6	30.0
Total of active teaching		28	12	11	60
Total of ECTS credits					60

4 courses upgraded/improved:

Hydraulic engineering

Groundwater hydraulics

Measurements in hydrotechnics

River engineering

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University of Sarajevo

Faculty of Civil Engineering: the Bachelor, Master and Doctoral Study Programs are organized according to the system of (3+2+3) years.

Bachelor programme: CIVIL ENGINEERING – General studies (3 years/6 semesters)

Existing courses related to WRM:

Hydromechanics

Water supply and wastewater disposal

Hydrotechnical buildings

3. Development of Water Engineering and WRM courses in HEIs in WB

University of Sarajevo

Master programme: CIVIL ENGINEERING MASTER -WATER AND ENVIRONMENTAL ENGINEERING (2 years/4 semesters)

4 courses upgraded/improved:

Treatment of drinking water

Sewage systems

Water Resources Managment

Water Protection I

3. Development of Water Engineering and WRM courses in HEIs in WB

Džemal Bijedić University of Mostar

Faculty of Civil Engineering: the Bachelor, Master and Doctoral Study Programs are organized according to the system of (3+2+3) years.

Bachelor programme: CIVIL ENGINEERING – General studies (3 years/6 semesters)

Existing courses related to WRM:

Hydromechanics

Water supply and wastewater disposal

Hydrotechnical buildings

3. Development of Water Engineering and WRM courses in HEIs in WB

Džemal Bijedić University of Mostar

Master programme: ENVIRONMENTAL INFRASTRUCTURE MANAGEMENT (2 years/4 semesters):

- 1 new course
- 2 courses upgraded/improved

Existing courses	New courses/ upgraded
Water protection (e)	Water Protection
Sustainable management of municipal water utilities	Urban hydrology
Sustainable water management in the local community	Sustainable Management of Communal Water Supply Enterprises
Hydropower (e)	
Wastewater disposal (e)	

3. Development of Water Engineering and WRM courses in HEIs in WB

University of Niš

Faculty of Civil Engineering and Architecture: the Bachelor, Master and Doctoral Study Programs are organized according to the system of studying 4+1+3.

Bachelor programme: PROJECT MANAGEMENT (4 years/8 semesters):

- 4 new courses

Existing courses	New courses
Fluid-mechanics (e)	Basis of hydrometeorology
Basics of Hydrology (e)	Urban Infrastructures
Hydrotehnics	Urban Hydrology (e)
Hydropower (e)	Urban Water
Groundwater (e)	
Urban Hydrotehnics (e)	

3. Development of Water Engineering and WRM courses in HEIs in WB

University of Niš

Master programme: PROJECT MANAGEMENT MASTER (1 years/2 semesters):

- 2 new courses

Existing courses	New courses
Water Treatment Plant Management	Sustainable Urban Drainage Systems
Drinking Water Purification (e)	Circular Economy and Water Resources
Water Resources Management (e)	

3. Development of Water Engineering and WRM courses in HEIs in WB

University of Priština in Kosovska Mitrovica

Faculty of Tehnical Sciences: the Bachelor, Master and Doctoral Study Programs are organized according to the system of (4+1+3) years.

Bachelor programme: ENVIRONMENTAL AND OCCUPATIONAL SAFETY ENGINEERING (4 years/8 semesters):

- 3 new courses
- 1 course upgraded/improved

Existing courses	New courses/upgraded
Basics of Environmental Engineering	Water Resources Management
Fluid-mechanics	Modern methods in the preparation of drinking water
Hydro-technics 1	Advanced techniques in wastewater treatment
Hydro-technics 2	Protection and water resources management
Hydro-technical infrastructure systems (e)	

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3. Development of Water Engineering and WRM courses in HEIs in WB

University of Priština in Kosovska Mitrovica

Master study programme: ENVIRONMENTAL AND OCCUPATIONAL SAFETY ENGINEERING (1 year/2 semesters):

- 2 new courses

Existing courses	New courses
Design of Hydraulic Structures	Groundwater use, protection and management
Hydro technical Systems (e)	Water treatment technologies in industry
Facilities of hydro power systems and plants (e)	
Planning and design of hydraulic structures (e)	

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3. Development of Water Engineering and WRM courses in HEIs in WB

University of Novi Sad

Faculty of Tehnical Sciences: the Bachelor, Master and Doctoral Study Programs are organized according to the system of 4+1+3 (3+2+3) years.

Master programme: WATER TREATMENT AND SAFETY ENGINEERING

(2 years/4 semesters):

- 5 new courses
- 1 course upgraded/improved

New courses/upgraded
Analysis of environmental protection systems
Environmental Practicum
Groundwater flow
Alternative separation processes in water treatment
Water Quality Management and Methods for Sediment Remediation
Open channel hydraulics

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3. Development of Water Engineering and WRM courses in HEIs in WB

Technical college of applied sciences Urosevac /Leposavic

Faculty of Tehnical Sciences: the Basic and Specialist studies are organized according to the system of 3 years and (3+1) program

New specialist study program: WATER PROTECTION

- 3 new courses

New courses
Basic Principles of Water Management and Policy
Water Treatment Methods and Technologies
Fundamentals of water protection

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4. Good Practices

Restructuring of Curricula every 4-5 years – Committee on Civil Engineering Curricula

Cooperation with Civil Engineering and Water Engineering Professionals- Advisory Committee of Professionals

Lessons and Practices from other countries (USA and EU) butneeds are different

Introduce new methods and techniques in Design and Analysis in conjunction with existing methods used in practice

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5. Conclusions

- ✓ Study Programs and Curricula for meeting the professional needs in Water Engineering and Civil Engineering in general.
- ✓ Means for developing students' ability on critical thinking, practical consideration and alternative solutions in Engineering Problems (e.g. Project-based courses, Laboratory and hands-on experience, Construction Methods etc.)
- ✓ Design, Analysis and Construction Methods in Applied Water Engineering
- ✓ Environmental Impact Assessment : A prerequisite for all Engineering Infrastructures
- ✓ The University Environment able to provide the new generation of Engineers with professional ethics, ethos and culture for the benefit of all citizens

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“Ideal teachers are those who use themselves as bridges over which they invite their students to cross, then having facilitated their crossing, joyfully collapse, encouraging them to create bridges of their own.”

Nikos Kazantzakis

TheFamousPeople.com

Thank you!