

Erasmus+
PROJECT



Booklet on Project Achievements

In the final year of the project implementation

highlights

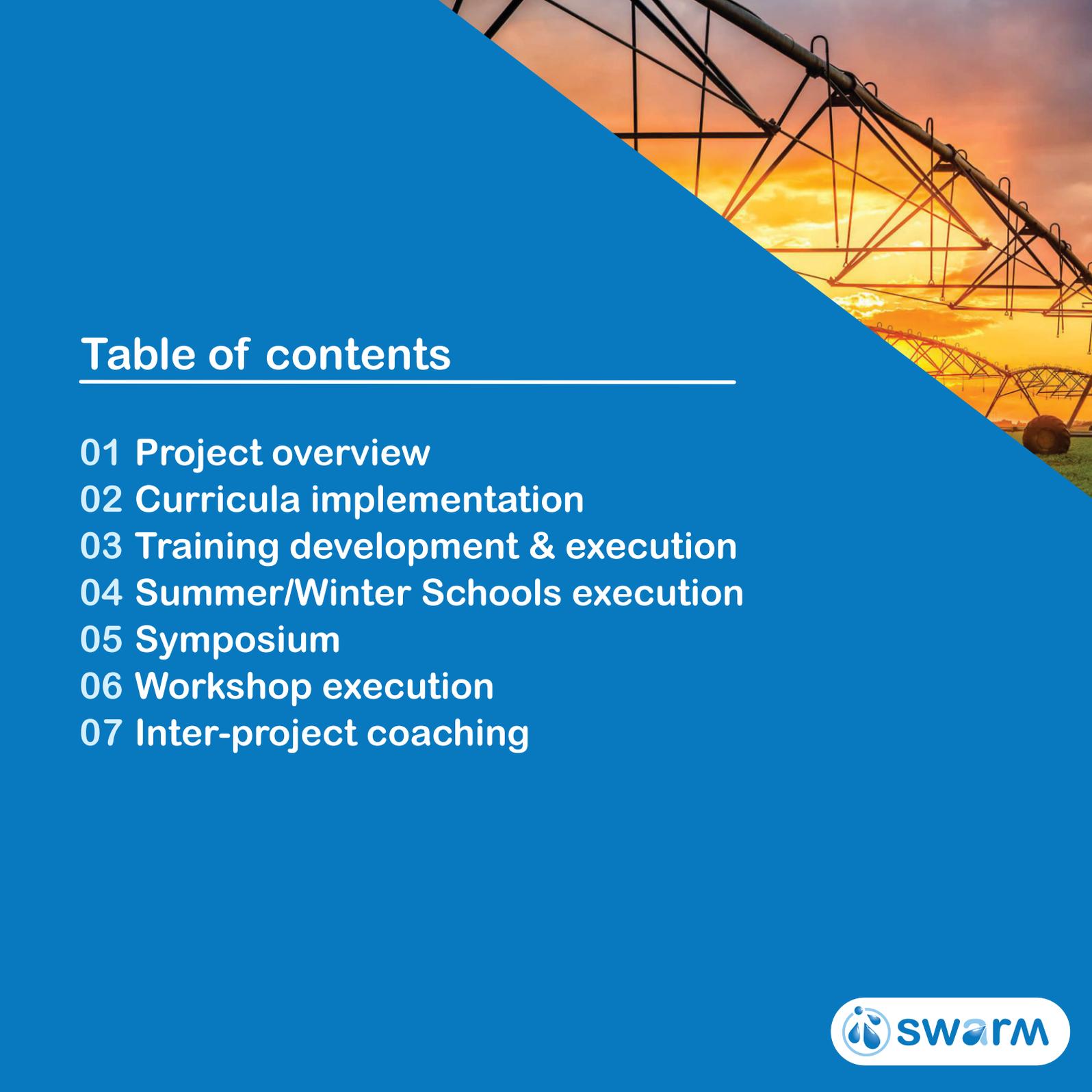


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Strengthening of Master Curricula in Water Resources Management for the Western Balkans HEIs and stakeholders



Overall objective of the project was education of experts for water resources management in the Western Balkans (WB) in line with the national and EU policies.

Our mission was to strengthen the educational base in WB partner HEIs in cooperation with EU project partners by developing new and innovative master programmes in the field of water resources management (WRM) in line with the Bologna requirements and national accreditation standards and by designing and implementing seven new and up-to-date laboratories.

We set our goals to enhance water sector skills and competence by developing and implementing LLL courses for the water sector in line with EU Water Framework Directive.

PROJECT DURATION:
November 2018 - May 2022

www.swarm.ni.ac.rs



Curricula implementation





Curricula implementation

UNI



NEW MASTER & BACHELOR PROGRAM ACCREDITED

AASKM



NEW SPECIALIZED STUDY PROGRAM ACCREDITED

UNS



MASTER PROGRAM IMPROVED & REACCREDITED

UPKM



MASTER & BACHELOR PROGRAM IMPROVED & REACCREDITED

UNSA



MASTER PROGRAM IMPROVED & MODERNIZED

UNMO



MASTER PROGRAM IMPROVED & MODERNIZED

UoM



MASTER PROGRAM IMPROVED & MODERNIZED

SWARM undergraduate study program courses

WB HEI	Course title	New/modernized	Type of course	ECTS
UNI	Hydrotechnical Facilities	New	Mandatory	5
	Water energy management	New	Elective	5
	Water Supply and Sewerage of Buildings	New	Elective	5
	Municipal Hydrotechnics	New	Elective	5
UPKM	Water Resources Management	Modernized	Mandatory	5
	Modern methods in the preparation of drinking water	New	Mandatory	6
	Advanced techniques in wastewater treatment	New	Mandatory	6
	Protection and water resources management	New	Elective	5

SWARM master study program courses
1/2

WB HEI	Course title	New/modernized	Type of course	ECTS
UNI	Water Resources Management	New	Elective	5
	Hydrological Risks Management	New	Elective	4
UNS	Environmental Practicum	Modernized	Elective	7
	Groundwater Flow	New	Elective	7
	Alternative Separation Processes in Water Treatment	New	Mandatory	7
	Water Quality Management and Methods for Sediment Remediation	New	Mandatory	6
	Open Channel Hydraulics	New	Mandatory	6
	Fundamentals in hydrotechnics, hydromechanics and geotechnics	New	Elective	6
UNSA	Sewage Systems	Modernized	Mandatory	5
	Water Protection I	Modernized	Mandatory	5
	Treatment of drinking water	Modernized	Mandatory	6
	Integral Water Resources Management	Modernized	Elective	5

SWARM master study program courses
2/2

WB HEI	Course title	New/modernized	Type of course	ECTS
UNMO	Sustainable Management of Communal Water Supply Enterprises	Modernized	Mandatory	6
	Water Protection	Modernized	Elective	5
	Urban hydrology	Modernized	Elective	5
UPKM	Groundwater use, protection and management	New	Elective	6
	Water treatment technologies in industry	New	Elective	5
UoM	Hydraulic Engineering	Modernized	Mandatory	5
	Groundwater hydraulics	Modernized	Mandatory	5
	Measurements in hydrotechnics	Modernized	Mandatory	5
	River Engineering	Modernized	Mandatory	5
AASKM	Basic Principles of Water Resources Management and Policy	New	Mandatory	5
	Fundamentals of Water Resources Protection	New	Mandatory	6
	Water and Wastewater Treatment Methods and Technologies	New	Mandatory	5

**Title of study program and its type,
ECTS and number of enrolled students per school year**

WB HEI	Title of study program	Type	ECTS	Number of enrolled students (school year)
UNI	Project management in Civil Engineering	Bachelor	240	23 (2021/2022)
	Project management in Civil Engineering	Master	60	16 (2021/2022)
UNS	Water Treatment and Protection Engineering	Master	120	10 (2020/2021)
UNSA	Water and Environmental Engineering	Master	120	24 (2020/2021)
UNMO	Environmental infrastructure management	Master	120	10 (2021/2022)
UPKM	Environmental and Occupational Safety Engineering	Bachelor	240	10 (2020/2021) 17 (2021/2022)
	Environmental and Occupational Safety Engineering	Master	60	16 (2020/2021) 4 (2021/2022)
UoM	Water Engineering	Master	120	25 (2021/2022)
AASKM	Water Protection	Specialist professional study program	60	10 (2021/2022)

A group of approximately 20 people, including men and women, are standing in a line on a paved road. They are wearing high-visibility yellow safety vests and white hard hats. Some are also wearing blue jackets. In the background, there is a tunnel entrance with the text "RENSEANLEGG 1972" above it. To the right, there are white residential houses on a hillside under a cloudy sky. The entire image has a light blue tint.

Training development & execution



Training development & execution

target groups

- 💧 Consultants, engineers and experts working or looking to work in the water sector
- 💧 Water resource professionals including water managers, water resource engineers, hydrologists, hydro-geologists and water resource modelers
- 💧 Representatives from municipalities, councils and other government organisations
- 💧 Representatives from nonprofit, civil society, community-based organisations
- 💧 Programme and project managers, administrators, coordinators and other professionals who work on water-related or community-based projects
- 💧 Those who work or wish to get involved in addressing the growing water challenge

learning themes

- 💧 Water as a scarce resource
- 💧 EU water policy under the Water Framework Directive
- 💧 Water management and climate change adaptation
- 💧 Wastewater treatment and reuse of treated wastewater
- 💧 Flood and drought risk management
- 💧 IT tools in the water resources management
- 💧 Innovation in the water sector



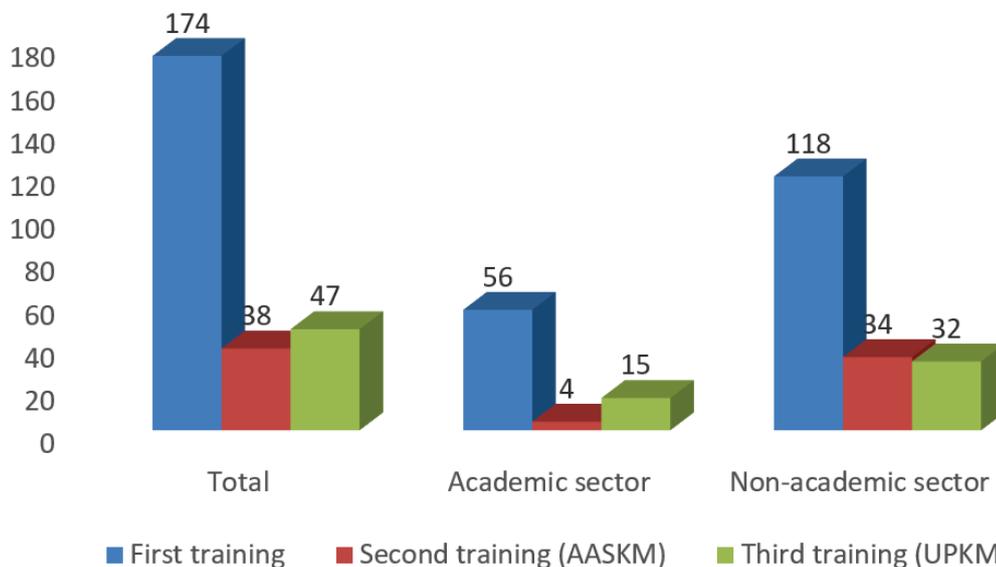
Training development & execution

the first training_ online 8-10 June 2021
UNI_UNNS_UoM_UNSA_UNMO_PWMC_VV_

the second training_ 28-30 June 2021
AASKM_location: Leposavic_

the third training_ 29 June - 1 July 2021
UPKM_location: Kosovska Mitrovica_

Number of participants





PRIMJERI HIDROELEKTRANA I
HE SUSTAVA U HRVATSKOJ

Barbara Karleuša
Sveučilište u Rijeci, Građevinski fakultet

Zimska škola, 15.-26.11.2021.

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

University of Rijeka www.swarm.hr.ac.rs

Strengthening of master curricula in water resources management for the Western Balkans HEIs and stakeholders
Project number: 597888-EPP-1-2018-1-RS-EPPKA2-CBHE-JP

Summer/Winter schools

for students_online_
_NMBU_UNIRIFCE_BOKU_UACEG_AUTH_UL

OBALNO INŽENJERSTVO: Primjena daljinskih istraživanja

Project title: Winter school
Acronym: SWARM
Project number: 597888-EPP-1-2018-1-RS-EPPKA2-CBHE-JP

Work package	Title
6	Dissemination & exploitation
activity	Title
6.5	Winter/summer schools

Date	15.11.2021. – 26.11.2021.
City	Rijeka
Meeting venue	University of Rijeka, Faculty of Civil Engineering (UNIRIFCE – ONLINE /VS Teams)
Address	Radnište Matejčić, 51000 Rijeka, Croatia

Strengthening of master curricula in water resources management for the Western Balkans HEIs and stakeholders

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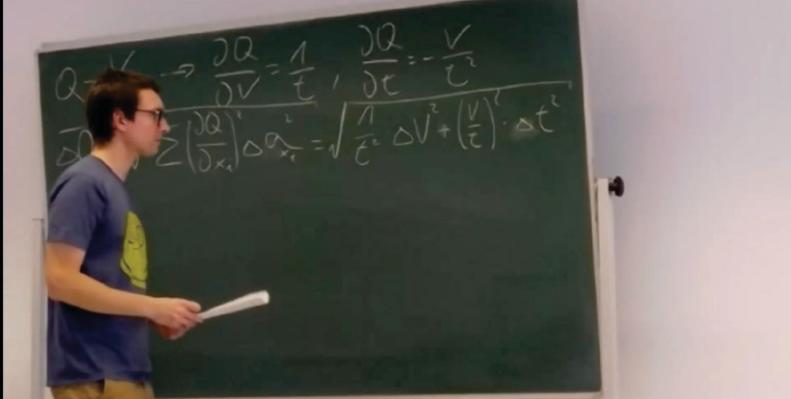
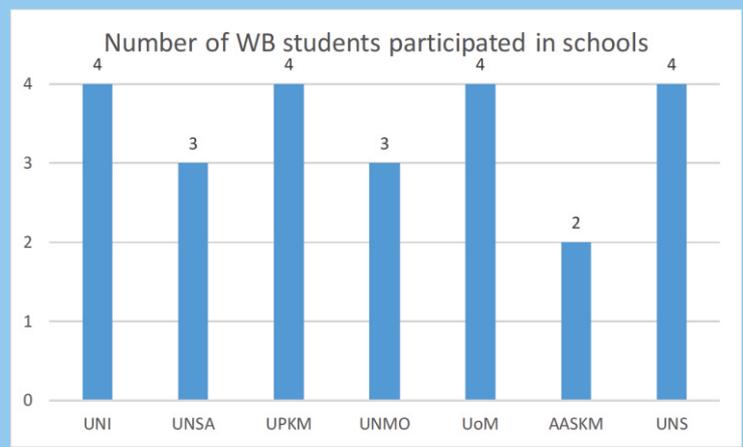
Summer/Winter Schools

25:51

Meeting in "General"



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.5	0	0.5	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	1.0	0	1.0	0.5	0.5	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	1.5	0	1.5	0.75	0.75	0.75	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2.0	0	2.0	0.75	0.75	0.75	0.25	0.0625	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	2.5	0	2.5	0.75	0.75	0.75	0.25	0.15625	0.03125	0.03125	0.03125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	3.0	0	3.0	0.75	0.75	0.75	0.25	0.25	0.0625	0.0625	0.0625	0.03125	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	3.5	0	3.5	0.75	0.75	0.75	0.25	0.34375	0.15625	0.15625	0.15625	0.0625	0.03125	0	0	0	0	0	0	0	0	0	0	0	0	0
8	4.0	0	4.0	0.75	0.75	0.75	0.25	0.4375	0.21875	0.21875	0.21875	0.09375	0.046875	0.0078125	0.0078125	0.0078125	0.0078125	0.0078125	0.0078125	0.0078125	0.0078125	0.0078125	0.0078125	0.0078125	0.0078125	0.0078125
9	4.5	0	4.5	0.75	0.75	0.75	0.25	0.53125	0.28125	0.28125	0.28125	0.1171875	0.05890625	0.01171875	0.01171875	0.01171875	0.01171875	0.01171875	0.01171875	0.01171875	0.01171875	0.01171875	0.01171875	0.01171875	0.01171875	0.01171875
10	5.0	0	5.0	0.75	0.75	0.75	0.25	0.625	0.34375	0.34375	0.34375	0.13671875	0.068359375	0.013671875	0.013671875	0.013671875	0.013671875	0.013671875	0.013671875	0.013671875	0.013671875	0.013671875	0.013671875	0.013671875	0.013671875	0.013671875
11	5.5	0	5.5	0.75	0.75	0.75	0.25	0.71875	0.40625	0.40625	0.40625	0.15625	0.078125	0.015625	0.015625	0.015625	0.015625	0.015625	0.015625	0.015625	0.015625	0.015625	0.015625	0.015625	0.015625	0.015625
12	6.0	0	6.0	0.75	0.75	0.75	0.25	0.8125	0.46875	0.46875	0.46875	0.17578125	0.087890625	0.017578125	0.017578125	0.017578125	0.017578125	0.017578125	0.017578125	0.017578125	0.017578125	0.017578125	0.017578125	0.017578125	0.017578125	0.017578125
13	6.5	0	6.5	0.75	0.75	0.75	0.25	0.90625	0.53125	0.53125	0.53125	0.1953125	0.09765625	0.01953125	0.01953125	0.01953125	0.01953125	0.01953125	0.01953125	0.01953125	0.01953125	0.01953125	0.01953125	0.01953125	0.01953125	0.01953125
14	7.0	0	7.0	0.75	0.75	0.75	0.25	1.0	0.59375	0.59375	0.59375	0.2128125	0.107421875	0.02128125	0.02128125	0.02128125	0.02128125	0.02128125	0.02128125	0.02128125	0.02128125	0.02128125	0.02128125	0.02128125	0.02128125	0.02128125
15	7.5	0	7.5	0.75	0.75	0.75	0.25	1.09375	0.65625	0.65625	0.65625	0.2303125	0.1171875	0.02303125	0.02303125	0.02303125	0.02303125	0.02303125	0.02303125	0.02303125	0.02303125	0.02303125	0.02303125	0.02303125	0.02303125	0.02303125
16	8.0	0	8.0	0.75	0.75	0.75	0.25	1.1875	0.71875	0.71875	0.71875	0.2478125	0.12703125	0.02478125	0.02478125	0.02478125	0.02478125	0.02478125	0.02478125	0.02478125	0.02478125	0.02478125	0.02478125	0.02478125	0.02478125	0.02478125
17	8.5	0	8.5	0.75	0.75	0.75	0.25	1.28125	0.78125	0.78125	0.78125	0.2653125	0.13671875	0.02653125	0.02653125	0.02653125	0.02653125	0.02653125	0.02653125	0.02653125	0.02653125	0.02653125	0.02653125	0.02653125	0.02653125	0.02653125
18	9.0	0	9.0	0.75	0.75	0.75	0.25	1.375	0.84375	0.84375	0.84375	0.2828125	0.14609375	0.02828125	0.02828125	0.02828125	0.02828125	0.02828125	0.02828125	0.02828125	0.02828125	0.02828125	0.02828125	0.02828125	0.02828125	0.02828125
19	9.5	0	9.5	0.75	0.75	0.75	0.25	1.46875	0.90625	0.90625	0.90625	0.3003125	0.1553125	0.03003125	0.03003125	0.03003125	0.03003125	0.03003125	0.03003125	0.03003125	0.03003125	0.03003125	0.03003125	0.03003125	0.03003125	0.03003125
20	10.0	0	10.0	0.75	0.75	0.75	0.25	1.5625	0.96875	0.96875	0.96875	0.3178125	0.1640625	0.03178125	0.03178125	0.03178125	0.03178125	0.03178125	0.03178125	0.03178125	0.03178125	0.03178125	0.03178125	0.03178125	0.03178125	0.03178125
21	10.5	0	10.5	0.75	0.75	0.75	0.25	1.65625	1.03125	1.03125	1.03125	0.3353125	0.1728125	0.03353125	0.03353125	0.03353125	0.03353125	0.03353125	0.03353125	0.03353125	0.03353125	0.03353125	0.03353125	0.03353125	0.03353125	0.03353125
22	11.0	0	11.0	0.75	0.75	0.75	0.25	1.75	1.09375	1.09375	1.09375	0.3528125	0.18125	0.03528125	0.03528125	0.03528125	0.03528125	0.03528125	0.03528125	0.03528125	0.03528125	0.03528125	0.03528125	0.03528125	0.03528125	0.03528125
23	11.5	0	11.5	0.75	0.75	0.75	0.25	1.84375	1.15625	1.15625	1.15625	0.3703125	0.1890625	0.03703125	0.03703125	0.03703125	0.03703125	0.03703125	0.03703125	0.03703125	0.03703125	0.03703125	0.03703125	0.03703125	0.03703125	0.03703125
24	12.0	0	12.0	0.75	0.75	0.75	0.25	1.9375	1.21875	1.21875	1.21875	0.3878125	0.196875	0.03878125	0.03878125	0.03878125	0.03878125	0.03878125	0.03878125	0.03878125	0.03878125	0.03878125	0.03878125	0.03878125	0.03878125	0.03878125
25	12.5	0	12.5	0.75	0.75	0.75	0.25	2.03125	1.28125	1.28125	1.28125	0.4053125	0.2046875	0.04053125	0.04053125	0.04053125	0.04053125	0.04053125	0.04053125	0.04053125	0.04053125	0.04053125	0.04053125	0.04053125	0.04053125	0.04053125
26	13.0	0	13.0	0.75	0.75	0.75	0.25	2.125	1.34375	1.34375	1.34375	0.4228125	0.2125	0.04228125	0.04228125	0.04228125	0.04228125	0.04228125	0.04228125	0.04228125	0.04228125	0.04228125	0.04228125	0.04228125	0.04228125	0.04228125
27	13.5	0	13.5	0.75	0.75	0.75	0.25	2.21875	1.40625	1.40625	1.40625	0.4403125	0.2203125	0.04403125	0.04403125	0.04403125	0.04403125	0.04403125	0.04403125	0.04403125	0.04403125	0.04403125	0.04403125	0.04403125	0.04403125	0.04403125
28	14.0	0	14.0	0.75	0.75	0.75	0.25	2.3125	1.46875	1.46875	1.46875	0.4578125	0.228125	0.04578125	0.04578125	0.04578125	0.04578125	0.04578125	0.04578125	0.04578125	0.04578125	0.04578125	0.04578125	0.04578125	0.04578125	0.04578125





Symposium on WRM

Novi Sad, Serbia 23-24 September 2021_

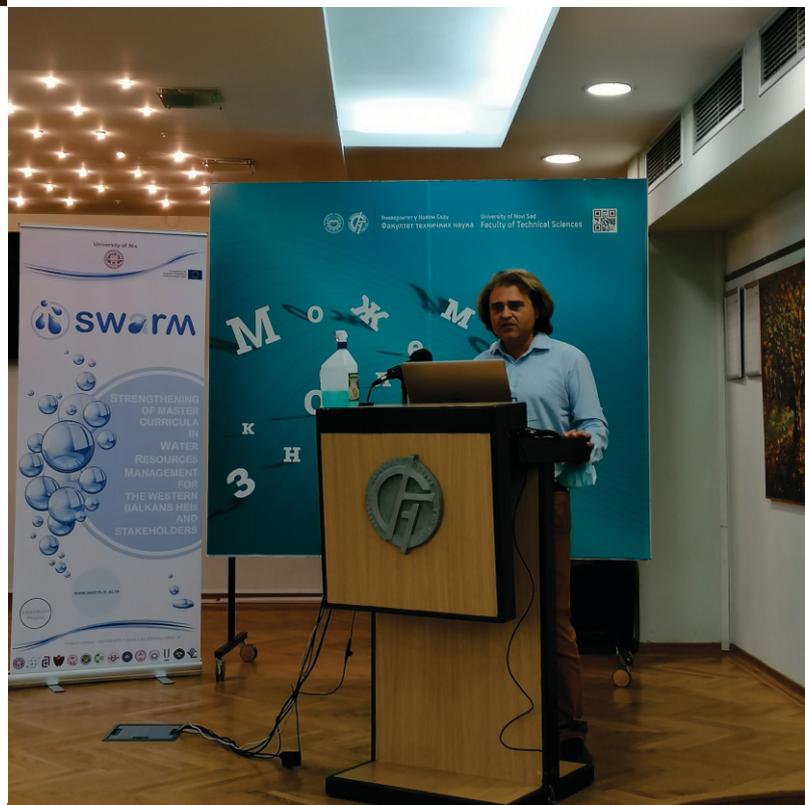
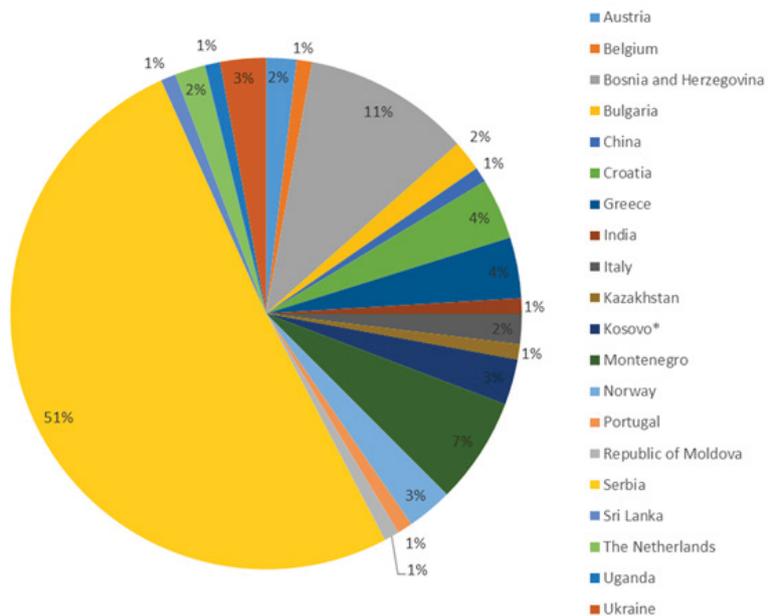


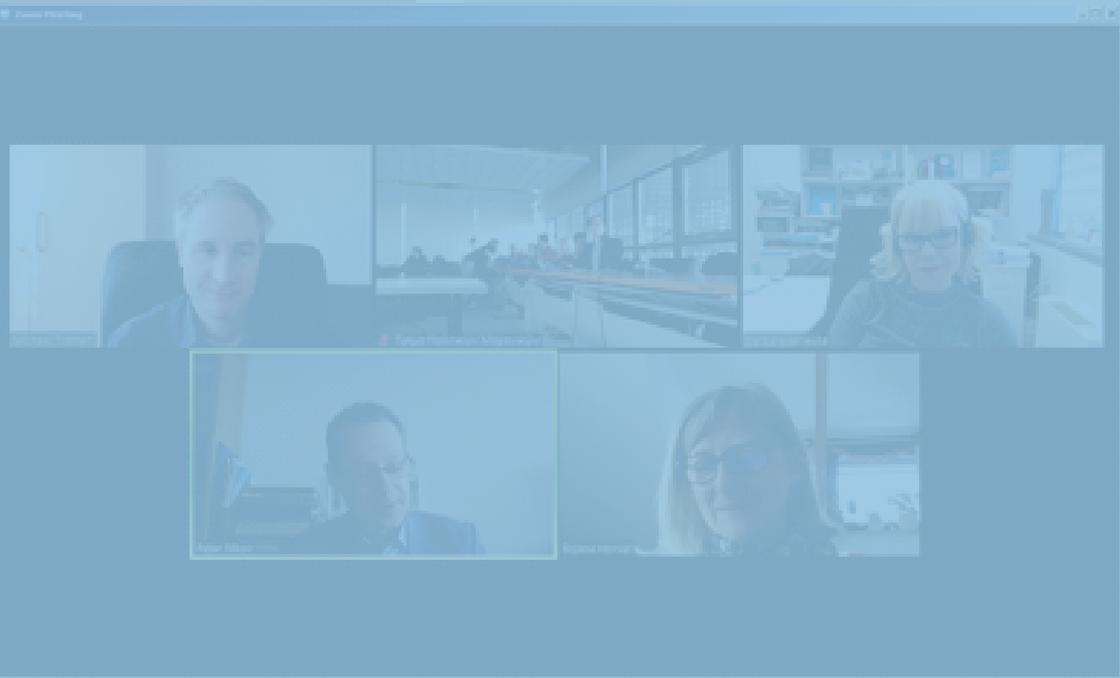


Symposium on WRM

symposium topics

- Water resources planning and management under uncertainty, climate variability and climate change
- Risk assessment and management of hydrological hazards,
- Integrated modelling of water resources: new directions,
- Water resources management in transboundary river basins,
- Hydropolitics and Water governance: current issues and future perspectives,
- Complexity of water resources management in WB countries,
- Capacity building in water resource management in HEIs,
- Technological advances in water resources management: remote sensing and data science methods,
- Water supply and wastewater management technology,
- Desalination and water reuse: opportunities and challenges,
- River flow modeling,
- Water management infrastructure





Workshop execution

ON THE SUSTAINABILITY OF THE SWARM RESULTS





Workshop execution

20-21 December 2021 online & AUTh

workshop topics

- **dissemination and sustainability**
- **experiences and good practices in the implementation of similar projects in programme partner countries**
- **feedback from the organized schools**
- **impact of the SWARM results on different levels**



Workshop conclusions

- organize summer schools on regular basis
- identify synergies in research interests among all partners
- develop new LLL courses for professionals
- introduce a new project idea relevant to the funding landscape
- organize new webinars for WB stakeholders
- use the equipment for research projects
- keep cooperation between HEI-WB, widely
- improve continually syllabi regarding IWRM
- motivate ourselves for self-development
- explore ways of broader collaboration
- cooperate with practice
- use the equipment by students
- organize the symposium
- disseminate through conferences, seminars, publications
- develop training material for using new equipment
- delegate tasks more equally distributed
- valorize the scientific capability of the partners and not only their geographical localization
- promote developed/modernized master study programmes
- stop working online and work in-person, end COVID
- do less reports and more scientific contributions,
- add new courses



Inter-project coaching



Inter-project coaching

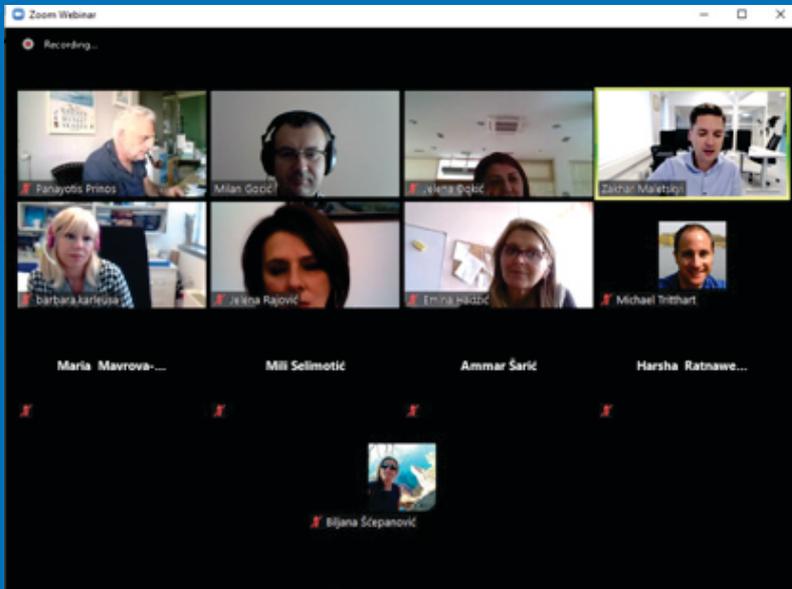
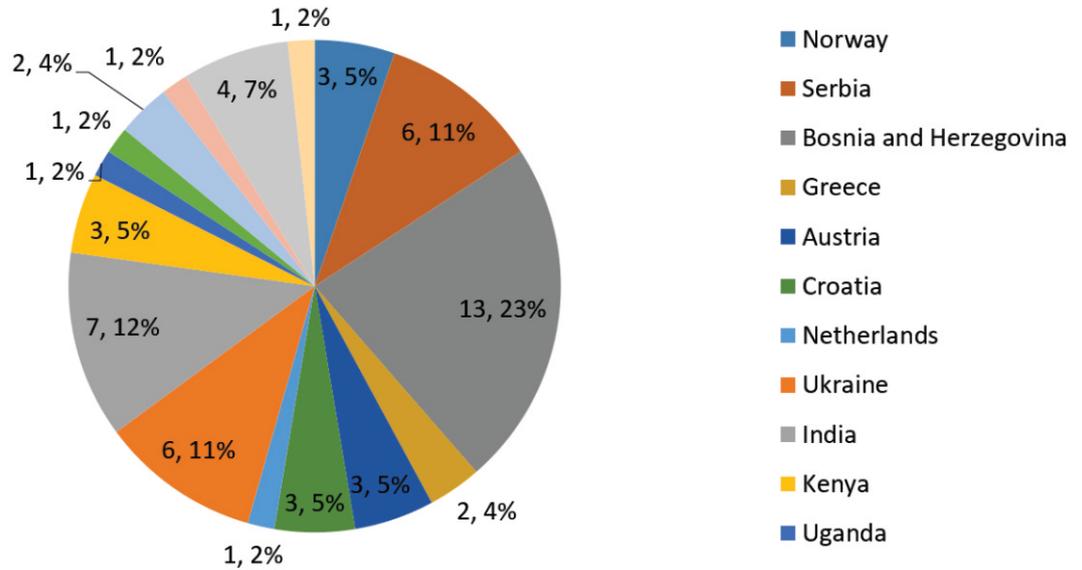
main points of discussion and conclusions

- developing new or modernizing existing curricula for undergraduate and master studies in accordance with Bologna requirements and national accreditation standards,
- retraining teaching staff with up-to-date knowledge to teach on the new or improved study programmes,
- introducing an advanced teaching and learning process,
- introducing new laboratory equipment, library units and software necessary for the continuation of study programmes,
- creating an internship programme in cooperation with industry and SME sector,
- involving experts from industry in the education process.



Inter-project coaching

Number of participants



purposes of the meeting

- share projects' outcomes & future ideas,
- focus on knowledge exchanges with partners



TIMELINE

INFOGRAPHICS





TIMELINE

2018

Project started
Kick-off meeting

2019

REPORTS on

- WB regional issues related to WRM & EU polices and recommendations
- Water Sector Needs in WB

CATALOGUE of Competencies
Quality Assurance, Dissemination and Exploitation
PLANS
WORKSHOP at BOKU
TEACHING STAFF TRAINING at UACEG, AUTH, UL

2020

UNIQUE SET of Courses
TEACHING STAFF at BOKU
HANDBOOK for Training for Water Sector
LABORATORIES EQUIPPED
WEBINAR "Frontiers in WRM"
NEW PROGRAMS (re)accredited at UPKM, UNI, UNS, AASKM
FIRST 45 STUDENTS enrolled at UNS, UNSA, UPKM
Inter-project coaching meeting (online)

2021

ONLINE TRAINING for Water Sector
Face-to-face TRAINING for Water Sector
NEW STUDENTS enrolled at UNI, UNS, UNSA, UPKM, UNMO, UoM, AASKM
SYMPOSIUM on WRM
SUMMER/WINTER SCHOOLS for students (online)
Inter-project coaching meetings
ROUNDTABLES with non-academic sector
WORKSHOP at AUTH

2022

REPORT on implemented curricula
WINTER SCHOOLS for teaching staff at UACEG, UNIRIFCE, BOKU

CONSORTIUM:

EU partners

University of Natural Resources and Life Sciences,
Vienna _ **BOKU, Austria**
Norwegian University of Life Sciences _ **NMBU, Norway**
Aristotle University of Thessaloniki _ **AÜTh, Greece**
University of Architecture, Civil Engineering and
Geodesy _ **UACEG, Bulgaria**
University of Rijeka, Faculty of Civil Engineering _
UNIRIFCE, Croatia
Universidade de Lisboa _ **UL, Portugal**

WB partners

University of Niš _ **UNI, Serbia**
University of Novi Sad _ **UNS, Serbia**
University of Sarajevo _ **UNSA, Bosnia and
Herzegovina**
Džemal Bijedić University of Mostar _ **UNMO, Bosnia
and Herzegovina**
University of Priština in Kosovska Mitrovica _ **UPKM,
Kosovo***
Academy of Applied Studies of Kosovo and Metohija _
AASKM, Kosovo*
University of Montenegro _ **UoM, Montenegro**
Public Water Management Company "Vode Vojvodine" _
PWMC VV, Serbia



ASSOCIATED PARTNERS:

"Sofiyska voda" AD, Sofia, Bulgaria
Association for Water Technology and Sanitary
Engineering
Association Resource Aarhus Center in B&H
Regional water supply "Crnogorsko primorje",
Montenegro

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