

The Water and Environment Centre

Education Booklet

Postgraduate Studies

(Diploma/ Master Program)



Water and
Environment Centre

In Brief

The postgraduate studies and training unit at the Water and Environment Centre was established in 1999 to coordinate the development and implementation of teaching and training at the WEC. The unit within the centre is now running a bilingual Integrated Water Resources Management (IWRM) MSc and Diploma program which includes MSc and Diploma research projects. In addition, the unit collaborates closely with the Sana'a University Graduate Studies & Scientific Research. In this document we focus on the IWRM program. For further information on the training and courses given at WEC please read WEC's training courses guide.

In 2004, the Water and Environment Centre postgraduate studies and training unit started the development of a bilingual MSc Program on IWRM in collaboration with Wageningen University and the Technical University in Delft, the Netherlands. The curriculum has been developed, improved, adjusted and evaluated by lecturers, advisors and IWRM students. The entire curriculum was assessed and reviewed in 2013 to incorporate several cross-cutting topics, such as climate change and gender. This document provides interested people in this program with the overall curriculum objectives, course objectives and expected competencies to be acquired by students upon successful graduation from the program. Moreover, we have included a description of the Water and Environment Centre, which provides the boundary conditions for this excellent curriculum. Although we

present the curriculum description as a finished product, an educational program on a topic of water management is never finished. New activities, thoughts and insights are continuously incorporated in the program. WEC will continue this process of innovation with the help of the Yemeni water sector, the international community, and above all, the graduates from the program. Through the IWRM MSc Program, WEC wants to contribute to practical solutions to water security issues. It wants to accelerate and broaden the flow of workable ideas and solid knowledge in water management in Yemen. As such, it wants to make the work of the University relevant to one of the major challenges in the country and beyond. WEC thus provides a linkage based on IWRM principles between academic knowledge and skills at Sana'a University and the agencies

responsible for water development and management in Yemen.

Students entering the program are highly motivated, have a BSc-degree from a range of technical and nontechnical disciplines, many of whom have considerable work experience in the water sector. When graduated from the IWRM study curriculum, students should have developed competencies which are in line with those required and sought for in their professions.

The program prepares students to develop and contribute to practical solutions for more water security and environmental challenges in Yemen; a 'critical thinking'. Graduates find employment opportunities in research, consultancy and government agencies, and therefore need that solid interdisciplinary knowledge on water and environment.

Postgraduate Studies



At the same time, the 'MSc' lab requires an academic approach to problems, allowing students to continue for PhD research. Find out more at: <http://www.wec.edu.ye/iwrm-diploma-msc-program>

Diploma & MSc Courses Descriptions

The WEC MSc Program on IWRM is a full time four-semester program. Students are expected to work 30 hours per week, partly in self-study.

In the first semester, students will develop a basic knowledge through the introductory courses in integrated water management, Urban water management, Water use in agriculture, Water Governance, and Basic skills.

In the second semester students develop skills to integrate these different disciplines. The courses in which this is done are: Integrated Watershed Management; Integrated Water Chain Management; Integrated Groundwater Management; Integrated Coastal Zone

Management; and Environmental Impact Assessment. Those courses are more practice-oriented, and knowledge from the first semester will be used.

In the third semester students will gain Advanced Research Methodologies and Writing skills. They will work in groups on the diploma project, in which students work on real-time cases from the Water and Environment sector. In these projects students are challenged to collectively devise solutions and advices similar to what would be

expected in a job in the (private) sector. The student receives a diploma after successful completion of the three semesters. If eligible, the student could proceed for an MSc degree in the fourth semester.

In the fourth semester, students work on an individual thesis research, applying knowledge acquired and academic skills gained throughout the three previous semesters.



** Students are required to choose at least one optional course during the second semester.

First Semester (Introductory Courses)		Module Title	Credits	Description
1.1	Integrated Water Management	5	1.1.1. Introduction to IWRM 1.1.2. Water Issues in Yemen and the Arab Region 1.1.3. Hydro-Geology and Water Resources in Yemen	
1.2	Urban Water Management	5	1.2.1. Water Use in Urban and Rural Areas 1.2.2. Sanitation and Wastewater Treatment 1.2.3. IWRM Case Study	
1.3	Water Use in Agriculture	4	1.3.1. Water Use in Agriculture 1.3.2. Water and Environment	
1.4	Water Governance	6	1.4.1. Water Rights and Policies 1.4.2. Gender and Water 1.4.3. Water Value and Economics	
1.5	Basic Skills	3	1.5.1. Report Writing 1.5.2. Basic Computer Skills and Research Methodology 1.5.3. GIS/RS	

**Second Semester
(Comprehensive Integrating courses)**

Module Title	Credits	Description
2.1 Integrated Watershed Management (compulsory)	6	2.1.1. Introduction 2.1.2. Hydrology and Water Balance of a Watershed 2.1.3. Spate Irrigation within the Context of IWSM 2.1.4. Management Options and Tools to Solve IWSM Issues 2.1.5. Group Work Project
2.2 Integrated Water Chain Management (elective) **	5	2.2.1. Introductory: Explanations of the Water Chain concept 2.2.2. Review of Conceptualisations of UWM from the Past up to Present 2.2.3. Urban Water Management in Yemen Region 2.2.4. Possible Integrated Urban Water Management (IUWM) Options in Newly Built Areas
2.3 Integrated Groundwater Management (elective) **	5	2.3.1. Introduction to IGWM 2.3.2. Technical Aspects on Groundwater Management 2.3.3. The Role of the Government in IGWM 2.3.4. IGWM Aspects 2.3.5. Sana'a Basin Case Study
2.4 Integrated Coastal Zone Management (elective) **	5	2.4.1. General Introduction 2.4.2. User Functions and Processes in Coastal Zones of Yemen 2.4.3. The Need for an Integrated Approach in Coastal Zone 2.4.4. Sustainable Development of Coastal Zones in Yemen

**** Students are required to choose at least one optional course during the second semester.**

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	Module Title	Credits	Description
Third Semester (Diploma Project)	2.5 Environmental Impact Assessment (compulsory)	5	2.5.1. Environmental Impact Assessment 2.5.2. The EIA Process 2.5.3. The Context of Environmental Analysis 2.5.4. EIA Project Evaluation and Decision Making 2.5.5. Post Project EIA Activities 2.5.6. World Bank Project Classification 2.5.7. Preparation of EIA Terms of References
	3.1 Advanced Research Methodologies and Writing (compulsory)	2	3.1.1. Advanced GIS 3.1.2. Quantitative & Qualitative Analysis 3.1.3. Academic Research Skills: Writing Course. This will include skills required and can be changed according to students' needs
	3.2 Diploma Project	4	// Students will work in groups on real-time problems in the management of water and environment. They will apply the knowledge obtained in the previous semesters to formulate and present a comprehensive integrated solution and advice to a sector problem. After successfully completing the third semester, students will receive a post-graduate diploma with a total of 45 credits.
Fourth Semester	4.1 MSc Thesis	9	// For students aiming to complete their study with an MSc degree, a 6-months thesis research can be carried out at WEC. Required is an approval from the WEC according to the academic guidelines of the master program.
Total Credits		54	

List of Former MSc. Researches (1999 -2014)

** For more information and updates, visit our page on: <http://www.wec.edu.ye/research>


• **Research Topics**

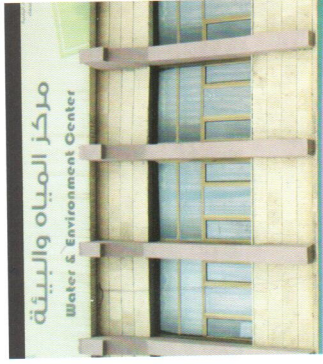
- Crop Water Productivity from the Field Level to the National Scale within the IWRM Framework, Case study: Qa'a Jahran
- Analysing the Potential of Roof Rainwater Harvesting System for Water Supply in Manakah Town and Surrounding Area
- Assessment of the October 24th 2008 Flood in Wadi Doan, Hadramout Towards Realization of IWRM
- Assessing Ground Water Recharge Potential in Wadi Zabid and its Impact on Supplementary Irrigation of Crops in Spate Irrigation Areas
- Assessment of Sources of Elevated Nitrate in Groundwater in Wadi Siham within IWRM Perspective
- Assessment of Water Resources Situation of Ghayl Bawazir Area in Hadramout Governorate from IWRM Perspective with Special Emphasis on Indigenous Traditional Practices
- Evaluation of the Benefits of Hammam Ali's Thermal Springs and their Sustainability from IWRM Perspectives
- The Health and Socioeconomic Impacts of Silver Impregnated Ceramic Filters in Four Villages in Amran Governorate
- Water User's Associations Evolution & Strengthening in Spate Areas within IWRM Approach, Case Study: Wadi Zabid – Tihama Plain
- Assessing Climate Change Trend and its Effects on Field Crop Water Requirements and Productivity, Dhamar as a Case Study

- Assessment of Introducing Water Saving Irrigation Technologies for Sustaining and Enhancing Crop Production in Jahran Area
- Exploitation of Rainfall and Treated Wastewater as Alternatives for Groundwater Use in Sana'a Basin
- Evaluating the potential of Road Rainwater Harvesting in Yemen, A case study of the Maghrabah Manakah Bab Bahil Road, Sana'a Governorate
- The Impact of Al-Azraqain Landfill on the Vicinity Groundwater Quality within IWRM Perspective
- Integrated Disposal Water Management in Oil Production, Case Study: Block 14 Al-Masila
- Assessment of Seawater Desalination as an Option for Augmenting Municipal Water Supply Ta'iz City and Integrating It into the Water Cycle
- Assessment of Water Demand Management in Wadi Hadhramaut Using IWRM Perspective, Case Study: Tarim Area
- Implementing Integrated Water Resources Management in Water Projects in Rural Areas in Al-Mahweet Governorate, Case Study: Yelaan, Sawaan, and Al-Dahabisha Villages
- Integrated Water Quality Management and its Impact on the Population of Mawyah
- Wastewater Reuse in Irrigation through Applying the IWRM Concept, Effluent of Sana'a Treatment Plant as a Case Study
- The Impact of Sana'a Waste Water Treatment Plant on the Drinking Water Quality in Bani Al-Harith District /Sana'a City
- Water Demand Management in Sana'a through applying the IWRM Concepts, Impact and Constraints of Grey Water Reuse in Agriculture at Sana'a City
- Integrated Watershed Management for a Small Catchment within Sana'a Basin

Contact information

If you are interested and would like to know more about the master program courses or researches, outreach activities of the WEC, you are pleased to visit the centre or our website, or contact us via e mail or phone.

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