

# Master in Life Sciences

A cooperation between  
BFH, FHNW, HES-SO, ZFH

<b>Module title</b>	<b>Water Management for Households, Industry and Agriculture</b>
<b>Code</b>	E6
<b>Degree Programme</b>	Master of Science in Life Sciences
<b>Group</b>	Environment
<b>Workload</b>	3 ECTS (90 student working hours: 42 lessons contact = 32 h; 58 h self-study)
<b>Module Coordinator</b>	<p><b>Name:</b> Dr. Thomas Wintgens  <b>Phone:</b> +41 (0)61 467 44 59  <b>Email:</b> <a href="mailto:thomas.wintgens@fhnw.ch">thomas.wintgens@fhnw.ch</a>  <b>Address:</b> FHNW, Gründenstrasse 40, CH-4132 Muttenz</p>
<b>Lecturers</b>	<ul style="list-style-type: none"> <li>• Dr. Wintgens, FHNW-HLS</li> <li>• R. Hochstrat, FHNW-HLS</li> <li>• E. Oertlé, FHNW-HLS</li> <li>• Dr. Ch. Hugli, FHNW-HLS</li> </ul>
<b>Entry requirements</b>	<p>Basic knowledge of environmental technologies and management.  Basic knowledge about water resources and environmental quality aspects (Blanc 2014).  Documents covering these aspects will be made available on Moodle, along with key questions that the students should be able to answer before the start of the module.  Respective competences will be assessed in a self-test.</p>
<b>Learning outcomes and competences</b>	<p>After completing the module, students will be able to:</p> <ul style="list-style-type: none"> <li>• explain the relationships between water quality aspects and human health as well as environmental quality.</li> <li>• apply basic methods to describe and assess water resources and their utilization for main sectors (household/industry/agriculture) and environmental needs.</li> <li>• apply methods in the different phases of managing the water cycle to enable efficient and effective utilization and conservation of water resources.</li> </ul>
<b>Module contents</b>	<ul style="list-style-type: none"> <li>• Characteristics of water resources, surface and groundwater</li> <li>• Status and exploitation of water resources (quantitative and qualitative aspects)</li> <li>• Water abstraction, treatment and distribution systems for the different sectors (household/industry/agriculture)</li> <li>• Water use/reuse/discharge and challenges in different sectors (household/industry/agriculture)</li> <li>• Water demand management and water loss prevention in the sectors</li> <li>• Monitoring and pricing of water use</li> <li>• Water resources protection incl. Habitat management</li> <li>• Water quality health and environmental impacts</li> <li>• Total water cycle management</li> <li>• Student seminar</li> </ul>
<b>Teaching / learning methods</b>	The module will be a mix of project/problem based lectures, tutorials and group work leading to a seminar presentation, practical exercises for water measurements (quantity and quality). Excursions will complement the programme.
<b>Assessment of learning outcome</b>	1. Student seminar presentation (individual) (30%)

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	<ol style="list-style-type: none"><li>2. Writing Assignment (individual), to be handed in 2 weeks after the end of the module (30%)</li><li>3. Written final exam (Closed book), final (40%)</li></ol>
<b>Format</b>	7-weeks
<b>Timing of the module</b>	Spring semester, CW 15-21
<b>Venue</b>	Olten
<b>Bibliography</b>	Blanc P (2014) Water in Switzerland – an overview. Swiss Academies of Arts and Sciences Holden JA (2013) Water Resources: An Integrated Approach. Taylor & Francis. ISBN-139780415602822 United Nations World Water Assessment Reports: <a href="http://www.unesco.org/new/en/natural-sciences/environment/water/wwap">http://www.unesco.org/new/en/natural-sciences/environment/water/wwap</a> Federal Office of Public Health and Federal Office for the Environment (2010) Reporting for Switzerland under the Protocol on Water and Health
<b>Language</b>	English
<b>Links to other modules</b>	Links with E3 “Sustainable Natural Resource Management”, GIS modules at HES-SO and BFH.
<b>Comments</b>	
<b>Last Update</b>	23.02.2018