

<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> Christoph Hugi  <b>Phone:</b> +41 61 228 55 84  <b>Email:</b> <a href="mailto:christoph.hugi@fhnw.ch">christoph.hugi@fhnw.ch</a>  <b>Address:</b> FHNW Campus MuttENZ, Hofackerstrasse 30, CH-4132 MuttENZ</p>
<b>Lecturers</b>	<ul style="list-style-type: none"> <li>• Christoph Studer, BFH-HAFL</li> <li>• Dirk Hengevoss, FHNW-HLS</li> <li>• Christoph Hugi, FHNW-HLS</li> <li>• Maryna Peter, 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: precipitation, surface water, 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 and supply management</li> <li>• Water distribution and water loss reduction</li> <li>• Monitoring and pricing of water use</li> <li>• Water resources protection</li> <li>• Water quality health and environmental impacts</li> <li>• Total water cycle management / integrated water resources 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, and several practical exercises on the water topics covered in the course (quantity and quality).



<b>Assessment of learning outcome</b>	1. Group writing assignment and seminar presentation during the course (40%) 2. Individual assignments during the course (60%)
<b>Format</b>	7-weeks
<b>Timing of the module</b>	Spring semester, CW 15-21
<b>Venue</b>	Mix of online and on-site lectures (in Olten)
<b>Bibliography</b>	<ul style="list-style-type: none"> <li>• BAFU about water resources management: <a href="#">Water resource management (admin.ch)</a> and <a href="#">High-level instruments (admin.ch)</a></li> <li>• Blanc P (2014) Water in Switzerland – an overview. Swiss Academies of Arts and Sciences</li> <li>• Holden JA (2013) Water Resources: An Integrated Approach. Taylor &amp; Francis. ISBN-139780415602822</li> <li>• 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></li> <li>• Federal Office of Public Health and Federal Office for the Environment (2010) Reporting for Switzerland under the Protocol on Water and Health</li> </ul>
<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>	11.09.2023