

# Master in Life Sciences

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

<b>Module title</b>	<b>Green Chemistry</b>
<b>Code</b>	C4
<b>Degree Programme</b>	Master of Science in Life Sciences
<b>Group</b>	Chemistry
<b>Workload</b>	3 ECTS (90 student working hours: 42 lessons contact = 32h; 58h self-study)
<b>Module Coordinator</b>	<p><b>Name:</b> Dr. Jürgen Stohner  <b>Phone:</b> +41 (0)58 934 54 93  <b>Email:</b> juergen.stohner@zhaw.ch  <b>Address:</b> ZHAW Life Sciences and Facility Management, Einsiedlerstrasse 31, 8820 Wädenswil</p>
<b>Lecturers</b>	<ul style="list-style-type: none"> <li>• Dr. Achim Ecker, ZHAW</li> <li>• Dr. Christian Frech, ZHAW</li> <li>• Guest Lecturer</li> </ul>
<b>Entry requirements</b>	Basic knowledge in chemistry on the level of a BSc Degree in Chemistry.
<b>Learning outcomes and competences</b>	<p>After completing the module, the students are able to:</p> <ul style="list-style-type: none"> <li>• evaluate the sustainability of industrial chemical and bio-chemical processes using different perspectives</li> <li>• explain the different steps of the supply chain (from raw materials to the products end of life) and their impact on sustainability</li> <li>• consider environmental, economic as well as social aspects in their assessment of industrial processes</li> </ul>
<b>Module contents</b>	<p><u>From Sustainability to Green Chemistry Metrics</u></p> <ul style="list-style-type: none"> <li>• History of sustainability</li> <li>• The chemical industry</li> <li>• 12 Principles of Green Chemistry</li> <li>• Green Chemistry Metrics</li> </ul> <p><u>Industrial Green Chemistry</u></p> <ul style="list-style-type: none"> <li>• The fine chemical industry</li> <li>• Green manufacturing concepts and their ecological impact</li> <li>• Green supply chain</li> <li>• Greenness vs. cost &amp; capital investment</li> </ul> <p><u>Solvent and Solvent systems</u></p> <p>Raw materials and environmental concerns are important and discussed as follows:</p> <ul style="list-style-type: none"> <li>• Introduction to solvents and solvent systems</li> <li>• Sustainable raw materials: evaluation/selection of green processes</li> <li>• Potential chemicals derived from sustainable raw materials (including processes to get these chemicals)</li> <li>• Ethanol production from crops (corn, sugar cane, wheat etc.), methyl-THF, etc.</li> <li>• Alternative green solvents and chemicals</li> </ul>

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<b>Teaching / learning methods</b>	<ul style="list-style-type: none"><li>• Lectures</li><li>• short seminars</li><li>• presentations</li><li>• case studies</li><li>• exercises</li><li>• demonstrations and self-study</li></ul> <p>When pre-readings and pre-course works are required, the students will be informed prior to the course.</p>
<b>Assessment of learning outcome</b>	1. Final written examination (100%).
<b>Format</b>	7-weeks
<b>Timing of the module</b>	Spring semester, CW 8 - 14
<b>Venue</b>	Olten
<b>Bibliography</b>	Will be announced at beginning of the lectures. Course material can be downloaded from the MSLS Moodle platform.
<b>Language</b>	English
<b>Links to other modules</b>	This module serves as basic course to the spring semester specialisation module "Green Chemistry – Advanced Concepts" at ZHAW.
<b>Comments</b>	
<b>Last Update</b>	23.02.2018