



Master in Life Sciences

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

Module title	Life Cycle Assessment
Code	E2
Degree Programme	Master of Science in Life Sciences
Group	Environment
Workload	3 ECTS (90 student working hours: 42 lessons contact = 32 h; 58 h self-study)
Module Coordinator	<p>Name: Dr. Matthias Meier Phone: +41 (0)31 910 22 88 Email: matthiassamuel.meier@bfh.ch Address: Bern University of Applied Sciences, HAFL, Länggasse 85, 3052 Zollikofen</p>
Lecturers	<ul style="list-style-type: none"> • Dr. Thomas Kägi (Carbotech) • Mischa Zschokke (Carbotech) • Dr. Matthias Meier (BFH-HAFL)
Entry requirements	<p>To be able to successfully participate in this module, students should have:</p> <ul style="list-style-type: none"> • profound knowledge of subject matter in their field of expertise; • basic knowledge of environmental challenges such as climate change, water pollution, ecosystem eutrophication, soil acidification, etc.; • experience in working with databases and analytical software (needed to be able to work with LCA software during the module). • A self-test for assessing personal competences in relation to the module contents is available on the Moodle platform.
Learning outcomes and competences	<p>After completing the module, students will be able to:</p> <ul style="list-style-type: none"> • understand the principles of life cycle assessment (LCA) and appraise the potential and limitations of the method for their personal field of expertise/work; • correctly plan and carry out an LCA using common LCA software tools and databases; • critically review and interpret LCA studies and results.
Module contents	<p>Quantitative information on the environmental impacts of products and services is ever more important in the optimization of production processes and value chains. LCA is the most widely used method for quantifying global warming potential, energy use, eutrophication potential and other environmental impacts of products and services, from cradle to grave.</p> <ul style="list-style-type: none"> • Life cycle thinking as the underlying principle of LCA. • Where did LCA evolve from and how was it developed further? Seminal examples of LCA. • How can LCA support environmental decision making? Applications of LCA in industrial and agricultural/food contexts. Use and misuse of LCA. • Overview of other methodological approaches based on life cycle thinking to assess social and economic sustainability aspects (social LCA, life cycle costing). • The four steps of LCA: 1. Goal and scope definition (defining goals, system boundaries, functional units amongst others); 2. Life cycle inventory analysis (data collection and emissions modelling); 3. Life cycle impact assessment (midpoint and endpoint impact assessment methods); 4 Interpretation of results (critical evaluation of reliability and limitations of the analysis).

	<ul style="list-style-type: none"> Case study (group work): students carry out an LCA of a product/service from their field of expertise using LCA software tools and databases.
Teaching / learning methods	<ul style="list-style-type: none"> Interactive lectures Discussions Group work (practical case study) Presentations (practical case study)
Assessment of learning outcome	<ol style="list-style-type: none"> Written group report on the LCA case study (50%) Oral group presentation of the LCA case study (50%)
Format	7-weeks
Timing of the module	Autumn semester, CW 45-51
Venue	Blended learning format. Presence sequences take place in Berne
Bibliography	<ul style="list-style-type: none"> ISO norms 14040 and 14044 Klöpffer W, Grahl B, 2014. Life Cycle Assessment (LCA): A Guide to Best Practice. Wiley-VCH Publishers. (Note: If you understand German, you should rather read the German version of this textbook.) Selected, regularly updated, articles that highlight potential and limitations of LCA e.g., in the food and chemical industries. A comprehensive script is available for download from the Moodle course of this module.
Language	English
Links to other modules	There is a link to several advanced sustainability modules (e.g., “Holistic Assessment of Production Systems” [MSLS_AF-22 AS] at BFH, “Sustainable Food Supply Chains” [MSLS F4] at ZHAW).
Comments	Students will CARRY OUT an LCA. It is important that they can choose the product (or service) to analyse; this allows them to draw on their diverse backgrounds.
Last Update	18.04.2023