

Valid from 2025.HS

Module description: Life Cycle Sustainability Assessment	
Module Code	w.MA.XX.LCSA.23HS
ECTS Credits	3
Language of Instruction/Examination	English
Module Description	<p>Environmental sustainability is the practice of using natural resources like water, soil, or air responsibly so they can support both present and future generations. United Nations Sustainable Development Goal (SDG) 12 targets “responsible consumption and production” by reducing the ecological footprint of products, services, and consumption patterns. Beyond that, social and economic sustainability goals aim to achieve, e.g., respect for human rights along value chains or sustained economic growth. Scientifically valid life-cycle-based information is crucial in order to implement sustainability strategies successfully. Life cycle assessment (LCA) is a helpful tool for aligning decisions with ecological criteria and reducing environmental impacts. This module covers LCA and related topics, including life cycle thinking, life cycle inventory modeling, and life cycle impact assessment from an environmental perspective. Other topics include the social and economic life-cycle perspective with social LCA and life cycle costing (LCC). In groups, students will apply life cycle thinking and LCA methods to specific problems. The module enables students to transfer insights from applied science to industry and society through life cycle thinking and life cycle management. Students will learn how to identify and develop effective sustainability measures that contribute to the global SDGs.</p>
Organizational Unit	Zurich Center for Sustainability Leadership
Module Coordinator	Matthias Stucki
Deputy Module Coordinator	Corinna Baumgartner
Program and Specialization	<ul style="list-style-type: none"> • Circular Economy Management
Legal Framework	Academic Regulations MSc in Circular Economy Management dated 02.06.2022, Appendix to the Academic Regulations for the degree program in Circular Economy Management, first adopted on 23.09.2022
Module Category	Module Type Compulsory
Prerequisite Knowledge	<p>Students should be able to:</p> <ul style="list-style-type: none"> • explain the drivers, mechanisms, and impacts of major environmental issues such as climate change, eutrophication, resource depletion, deforestation, etc. • elaborate on the sustainable development goals of the United Nations. • read, process, and critically discuss scientific publications from peer-reviewed journals, • understand the basics of systems theory, life cycle thinking, economics and chemistry, and • perform calculations and visualizations in MS Excel.
Contribution to Program Learning Objectives (by the concerned Module)	<ul style="list-style-type: none"> • Professional Competence • Methodological Competence • Social Competence • Self-Competence

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Contribution to Program Learning Objectives	Professional Competence <ul style="list-style-type: none">• Knowing and Understanding Content of Theoretical and Practical Relevance• Apply, Analyze, and Synthesize Content of Theoretical and Practical Relevance• Evaluate Content of Theoretical and Practical Relevance Methodological Competence <ul style="list-style-type: none">• Problem-Solving & Critical Thinking• Scientific Methodology• Work Methods, Techniques, and Procedures• Information Literacy• Creativity & Innovation Social Competence <ul style="list-style-type: none">• Written Communication• Oral Communication• Teamwork & Conflict Management• Intercultural Insight & Ability to Change Perspective Self-Competence <ul style="list-style-type: none">• Self-Management & Self-Reflection• Ethical & Social Responsibility• Learning & Change																											
Module Learning Objectives	Students... <ul style="list-style-type: none">• will explain the basic structure of LCA• will defend the purpose and scope of the application of different methods of environmental/sustainability analysis• will identify the environmental hotspots in the life cycle of products using LCA software.• will quantify and assess sustainability impacts using life-cycle-based approaches.• will analyze processes in complex value chains using systemic life cycle thinking approaches.																											
Module Content	<ul style="list-style-type: none">• Life Cycle Thinking – The Game.• Cradle to grave / cradle to cradle.• Life cycle inventory modelling.• The allocation challenge: Which life cycle is responsible for environmental impacts?• Life cycle impact assessment.• Aggregation of environmental impacts in a single score - ecological scarcity method.• LCA modelling with software.• Social LCA• Life cycle costing• Life cycle sustainability assessment																											
Links to other modules	This module is linked to the following modules:																											
Digital Learning Resources	<ul style="list-style-type: none">• Teaching Videos• Teaching Materials																											
Methods of Instruction	<ul style="list-style-type: none">• Case Studies• Exercises• Project Work• Lecture		Social Settings Used: <ul style="list-style-type: none">• Group Work																									
Type of Instruction	<table><tr><th></th><th>Classroom Instruction</th><th>Guided Self-Study</th><th>Autonomous Self-Study</th></tr><tr><td>Lecture</td><td>18 h</td><td>-</td><td></td></tr><tr><td>Excercise</td><td>6 h</td><td>6 h</td><td></td></tr><tr><td>Project Work</td><td>4 h</td><td>30 h</td><td></td></tr><tr><td>Seminar</td><td>-</td><td>-</td><td></td></tr><tr><td>Total</td><td>28 h</td><td>36 h</td><td>26 h</td></tr></table>					Classroom Instruction	Guided Self-Study	Autonomous Self-Study	Lecture	18 h	-		Excercise	6 h	6 h		Project Work	4 h	30 h		Seminar	-	-		Total	28 h	36 h	26 h
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Performance Assessment	End-of-module exam		Form	Length (min.)	Weighting
	-				
	Permitted Resources				
	Others	Assessment	Format	Length (min.)	Weighting
	Written Assignment	Pass/Fail	Einzelarbeit	0	0.00
	Talk/oral presentation	Pass/Fail	Gruppenarbeit	10	0.00
	Written Assignment	Grade	Gruppenarbeit	0	100.00
Classroom Attendance Requirement	80%				
	Compulsary attendance requirement for first and last lecture of the module as well as specific events as communicated on the first day of the module.				
Compulsory Reading	<ul style="list-style-type: none">• Sala, S., & Castellani, V. (2019). The consumer footprint: Monitoring sustainable development goal 12 with process-based life cycle assessment. Journal of Cleaner Production, 240, 118050. https://doi.org/10.1016/j.jclepro.2019.118050• Backes, J. G., & Traverso, M. (2022). Life cycle sustainability assessment as a metrics towards SDGs agenda 2030. Current Opinion in Green and Sustainable Chemistry, 38, 100683. https://doi.org/10.1016/j.cogsc.2022.100683• Stucki M. & Kröhnert H. (2022) Preparation material - Life Cycle Sustainability Assessment (PDF). Zurich University of Applied Sciences. Wädenswil				
Recommended Reading	<ul style="list-style-type: none">• ISO. (2006a). Environmental management - Life cycle assessment - Principles and framework. ISO 14040:2006; International Organization for Standardization (ISO); Geneva.• ISO. (2006b). Environmental management - Life cycle assessment - Requirements and guidelines. ISO 14044:2006. International Organization for Standardization (ISO); Geneva.				
Comments					