

Sustainable development

General Information

Number of ECTS Credits

3

Module code

CM_SustDev

Valid for academic year

2020-2021

Last modification

2020-02-10

Responsible of module

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Explanations regarding the language definitions for each location:

- Instruction is given in the language defined below for each location/each time the module is held.
- Documentation is available in the languages defined below. Where documents are in several languages, the percentage distribution is shown (100% = all the documentation).
- The examination is available 100% in the languages shown for each location/each time it is held.

	Berne	Lausanne	Lugano	Zurich
Instruction				X E 100%
Documentation				X E 100%
Examination				X E 100%

Module Category

CM Context module

Lessons

2 lecture periods and 1 tutorial period per week

Entry level competences

Prerequisites, previous knowledge

Brief course description of module objectives and content

Sustainable development is essential for many parts of modern society. This module provides an overview of the history of sustainable development, of established concepts, as well as of relevant initiatives and organisations globally and in Switzerland. Further, methodologies and tools are introduced for engineers to contribute to sustainable development on a technical level. Students learn the fields of application of the various methods as well as their strengths and weaknesses. They learn to apply the tools to analyze and improve the ecological performance of products and industrial processes.

Aims, content, methods

Learning objectives and acquired competencies

The students ...

- can define the term sustainable development and related concepts and know their similarities and differences as well as their history.
- understand the national and international debates, agendas and policy approaches to sustainable development and are able to consider what they mean in the context of their own field of study.
- are able to identify the roles of important stakeholders in sustainable development decision making.
- are able to analyze the implications of sustainable development for organizations, their executives and employees. Based on cases from various sectors, students are able to develop suitable strategies for action.
- understand what they personally can do to become more socially and environmentally responsible in their future professional and personal lives.
- know and understand different technical concepts to achieve a sustainable economy, sustainable business models and sustainable product design.
- know the most relevant tools for technical sustainability analysis and ecodesign, their fields of applications, strengths and weaknesses.
- are able to select the appropriate methods and tools when confronted with a specific technical sustainability problem.
- are able to interpret results generated with these methods and derive system optimizations.
- are able to identify, analyze and discuss sustainability-related challenges and issues and to develop problem-oriented solutions.
- are able to communicate and enact these solutions confidently and effectively.

Contents of module with emphasis on teaching content

- The global challenge of sustainability. Climate change, the end of the fossil age, planetary boundaries, global footprint.
- Sustainable development goals and their implications, other concepts.
- Organisations, political panels and global structure regarding sustainability and climate change, international negotiations and concepts (e.g. Paris agreement).
- Business concepts and examples of sustainability (Dyllick, GRI, Global Compact etc.)
- National aspects for the transformation (decarbonisation) of the existing building stock and related infrastructure
- Technical concepts to achieve a sustainable economy (industrial ecology, circular economy, etc.)
- Theory and practice of sustainability analysis and ecodesign methodologies and tools (substance flow analysis, life cycle assessment, a.o.)

Teaching and learning methods

- Lectures
- Exercises
- Group discussion
- Moderated plenary discussion
- Post-decision case studies
- Guest speaker
- Reflective paper

Literature

Global challenge

- Come on, A Report to the Club of Rome; E.U. von Weizsäcker 2017
- Haski-Leventhal, D. (2018): Strategic Corporate Social Responsibility: Tools and Theories for Responsible Management; Los Angeles: SAGE
- Sachs, J. D. (2015): The Age of Sustainable Development; New York: Columbia University Press.

Concepts and tools

- Towards the circular economy, Vol. 1-3. Ellen MacArthur Foundation, <https://www.ellenmacarthurfoundation.org/publications>
- Technologies and Eco-innovation towards Sustainability I, Eco Design of Products and Services, Editors: Hu, A.H., Matsumoto, M., Kuo, T.C., Smith, S. (Eds.), <https://www.springer.com/gp/book/9789811311802>
- Life Cycle Assessment - Theory and Practice - Editors: Hauschild, Michael, Rosenbaum, Ralph K., Olsen, Stig (Eds.), ISBN 978-3-319-56475-3, <https://www.springer.com/gp/book/9783319564746>
- Handbook of Material Flow Analysis: For Environmental, Resource, and Waste Engineers, Second Edition, ISBN 9781498721349 - CAT# K25579, <https://www.crcpress.com/Handbook-of-Material-Flow-Analysis-For-Environmental-Resource-and-Waste/Brunner-Rechberger/p/book/9781498721349>,

Assessment

Certification requirements

Basic principle for exams

As a rule, all the standard final exams for modules and also all repetition exams are to be in written form

Standard final exam for a module and written repetition exam

Kind of exam

written

Duration of exam

120 minutes

Permissible aids

Aids permitted as specified below:

Permissible electronic aids

No electronic aids permitted

Other permissible aids

Open book. Literature and notes from the lecture.

Special case: Repetition exam as oral exam

Kind of exam

oral

Duration of exam

30 minutes

Permissible aids

No aids permitted