



Course syllabus

Fundamentals of Sustainability and Circular Economy Grunderna för hållbarhet och cirkulär ekonomi

MTTA01, 3.0 credits, G1 (First Cycle)

Valid for: 2025/26 Faculty: Faculty of Engineering LTH Decided by: PLED I Date of Decision: 2025-03-03 Effective: 2025-05-05

General Information

Depth of study relative to the degree requirements: First cycle, has only upper-secondary level entry requirements **Elective for:** TILLF1 **Language of instruction:** The course will be given in English

Aim

The aim of this course is to equip students with a foundational understanding of sustainability and circular economy principles, enabling them to critically assess environmental challenges and explore solutions that promote long-term sustainability. The course fosters a systems-thinking approach and encourages responsible decision-making in various professional and everyday contexts by highlighting sustainability's interdisciplinary nature and its relevance across different sectors.

Learning outcomes

Knowledge and understanding For a passing grade the student must

- 1. Explain the core principles of sustainability and the circular economy.
 - 2. Describe major environmental challenges such as climate change, resource depletion, and pollution.
 - 3. Describe different sustainability frameworks (e.g., UN Sustainable Development Goals, Life Cycle Thinking).
 - 4. Understand how human activities impact natural systems and how sustainability can mitigate these effects.

Competences and skills

For a passing grade the student must

- 1. Assess the sustainability of products, services, and systems based on key indicators.
 - 2. Apply basic circular economy strategies in real-world problem-solving.
 - 3. Analyze simple sustainability case studies using life cycle perspectives.

Judgement and approach

For a passing grade the student must

- 1. Reflect on ethical considerations in sustainability decision-making.
 - 2. Critically evaluate sustainability claims and distinguish between genuine sustainability efforts and greenwashing.

Contents

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- 1. Introduction to Sustainability
- Definition and key concepts
- Environmental, social, and economic dimensions of sustainability
- The importance of sustainability in global development
- 1. Sustainable Development Goals (SDGs)
- Overview of the UN SDGs and their relevance to various sectors
- Examples of sustainability initiatives across different industries
- 1. Circular Economy Principles
- The transition from a linear economy to a circular economy
- Circular business models and sustainable consumption
 patterns
- 1. Life Cycle Thinking and Environmental Impact
- Introduction to Life Cycle Assessment (LCA)
- Carbon footprint, water footprint, and material efficiency
- 1. Sustainable Materials and Design Strategies
- Eco-design and sustainable material selection
- Strategies to minimize waste and improve product longevity
- 1. Sustainable Energy and Resource Management
- Renewable vs. non-renewable resources
- Energy efficiency and sustainable production methods

- 1. Challenges and Implementation of Circular Economy
- Barriers to sustainability adoption
- Policy, regulation, and economic incentives for sustainability
- Future trends in sustainability and the circular economy

Examination details

Grading scale: UG - (U, G) - (Fail, Pass) **Assessment:**

Students will be assessed on a pass/fail basis through:

- Quizzes and Knowledge Checks: Short multiple-choice quizzes to reinforce key concepts.
- Case Study Analysis: Students analyze a real-world sustainability case study and apply circular economy principles.
- Reflection Assignment: A short written reflection on personal or professional responsibilities in achieving sustainability.
- Final Online Assessment: A combination of short-answer questions and problem-solving exercises to test understanding.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Modules

Code: 0125. **Name:** Fundamentals of Sustainability and Circular Economy.

Credits: 3.0. **Grading scale:** UG - (U, G). **Assessment:** Students will be assessed on a pass/fail basis through: 1. Quizzes and Knowledge Checks: Short multiple-choice quizzes to reinforce key concepts. 2. Case Study Analysis: Analyze a real-world sustainability case study and apply circular economy principles. 3. Reflection Assignment: A short written reflection on personal or professional responsibilities in achieving sustainability. 4. Final Online Assessment: A combination of short-answer questions and problem-solving exercises to test understanding.

Admission

The number of participants is limited to: 5

Selection: Completed university credits within the programme. Priority is given to students enrolled on programmes that include the course in their curriculum.

Reading list

• Scientific articles and other source materials.

Contact

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