UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Tools and Indicators for Sustainability

2324-3-E3201Q113

Aims

The main objective is to provide the student with the theoretical and practical knowledge useful for evaluating the interaction between production activities and the environment from a sustainability perspective and the tools to operate in the field of innovation.

Knowledge and understanding
At the end of the course the student knows:

- The foundations of sustainable development;
- The fundamentals of circular economy and of waste cycle management;
- The fundamentals of management and certification systems in the areas of quality, safety at work, and environment;
- The main indicators of environmental sustainability.

Applying knowledge and understanding
At the end of the course the student is able to:

- Calculate environmental sustainability indicators (global warming potential, ozone depleting potential, EROEI, emergy, ecological footprint, carbon and water footprint);
- Set up the life cycle analysis of a product or process.

Making judgements
At the end of the course the student is able to:

- Analyze the phases of the life of a product or a process;
- Critically evaluate the results obtained in the calculation of environmental sustainability indicators;
- Identify possible interventions to reduce the impacts.

Learning skills

Being able to apply the acquired knowledge to contexts different from those presented during the course, and to understand how topics related to sustainability are covered in the scientific literature and addressed in the world of production and communication.

Contents

• Fundamental concepts: sustainability, system dynamics, circular economy, life cycle thinking.
• Monitoring and analysis tools for sustainable management of human activities: life cycle analysis, environmental sustainability indicators (global warming potential, ozone depleting potential, EROEI, emergy, ecological footprint, carbon and water footprint).
• Management and certification systems: quality, work safety, environment, social responsibility.
• ESG, Higg Index, Sustainability Reporting.

The course is structured in lectures to provide the student with basic knowledge of the fundamental principles enriched by thematic seminars held by sustainability experts and exercise sessions in the computer lab to practice with some applications used in this area.

Detailed program

The European Union considers sustainable production and consumption as a crucial and priority challenge of this century.
The goal is to improve the environmental performance of products and to increase the demand for products and technologies with a reduced environmental impact by creating synergies between the various policy instruments through an integrated approach between eco-design, product labeling, preparing for the reuse and recycling of waste materials.
Exercises: global warming potential, ecological footprint, water and carbon footprint, life cycle analysis. Case Studies.

Prerequisites

Fundamentals of Chemistry and Physics, Ecology

Teaching form

The course includes 3 CFU of lecture classes (24 hours) and 3 CFU of exercise sessions (30 hours) in the computer lab.

Textbook and teaching resource

Teaching material will be available on the e-learning platform.

Semester

second semester

Assessment method

Oral examination
The oral examination exam aim is to verify the knowledge of the topics covered in the lectures and exercises. In the oral exam, as far as possible, the student will be assessed on the basis of the following criteria: (1) knowledge and understanding; (2) ability to connect different concepts; (3) autonomy of analysis and judgment; (4) ability to use the scientific language correctly.
Exam grade in the range 18-30/30.

Office hours

By appointment to be made by e-mail (francesco.saliu@unimib.it, elena.collina@unimib.it).

Sustainable Development Goals

QUALITY EDUCATION | SUSTAINABLE CITIES AND COMMUNITIES | RESPONSIBLE CONSUMPTION AND PRODUCTION | CLIMATE ACTION