UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

From Waste To Wealth

2627-1-F7603Q023-F7603Q02303

Aims

This module of the laboratory course is designed to introduce students to the emerging field of urban mining, exploring how waste can be transformed into valuable resources. The course combines theoretical foundations with practical experiments to examine the opportunities and limits of waste valorization within a circular economy framework.

Students are invited to consult the syllabus of the entire course for details regarding learning- and skill-related objectives.

Contents

• Introduction to Urban Mining: concepts, definitions, and relevance.
• Waste Characterization: techniques for chemical and physical analysis.
• Technologies for material recovery and recycling.
• Environmental impacts: sustainability indicators and life cycle assessment in urban mining.
• Regulatory and economic aspects: overview of policies and market drivers.
• Practical laboratory sessions: experimental design, execution, and data interpretation.
• Case Studies: successes and challenges in turning waste into wealth.

Detailed program

• Overview of Urban Mining and Waste-to-Wealth concepts.
• Waste characterization: methods for assessing waste composition.
• Technologies in Urban Mining: recovery and recycling processes.

• Environmental and economic evaluation of recovery techniques.
• Laboratory practicals: setting up experiments for material recovery.
• Data analysis and process optimization.
• Final project: developing a proposal for urban mining implementation.

Prerequisites

• Basic knowledge of chemistry and material science.
• Familiarity with environmental science concepts is recommended.
• Fundamental laboratory skills and experience in data analysis.

Teaching form

2 CFU of mixed didactics in the classroom (20 hours):
• 4 two-hour lectures, in person, Delivered Didactics;
• 6 two-hour experimental sessions and collaborative sessions, in person, Interactive Teaching.

Attendance to lectures and interactive exercises is highly recommended.

Textbook and teaching resource

• Selected scientific articles, reports, and case studies on urban mining and waste management.
• Recommended reading: “Urban Mining: Recycling Metals from Waste” (or equivalent current literature).
• Laboratory manuals, online resources, and additional materials provided during the course.

Semester

II semester (March - June)

Assessment method

At the end of this module, evaluation comprises a project presentation and a comprehensive written report.

The final oral exam for the laboratory course as a whole comprises the discussion of various topics covered in the three modules, with an emphasis also on the connections between concepts and tools, such as to arrive at a critical evaluation of the laboratory course topics as a whole.

The final score will be between 18/30 and 30/30 *cum laude*, based on the overall assessment considering the following criteria:
(1) knowledge and understanding;

(2) ability to connect different concepts;
(3) autonomy of analysis and judgment;
(4) ability to correctly use scientific language.

Office hours

Always, after scheduling an appointment *via* phone or e-mail.

Sustainable Development Goals

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