UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Sustainability and Safety of Process and Products in Different Frameworks

2627-2-F7603Q009-F7603Q00901

Aims

The objectives of the course are divided as follows:

i) Knowledge and understanding

- Acquire the theoretical knowledge necessary to understand the relationships between production processes, potential pollutant emissions, and their effects on human health.
- Acquire the procedural knowledge required to estimate the impacts on an exposed population resulting from the presence of pollutants in a reference environment.
- Gain familiarity with the core procedures of toxicological risk assessment and the integration of interdisciplinary information (chemical, physical, and biological) within the Safe and Sustainable by Design framework.

ii) Applying knowledge and understanding

- Ability to identify and apply data from literature or databases to assess potential risks to human health when evaluating production processes or innovative products.

iii) Making judgements – Communication skills

- Ability to assess impacts on humans and to formulate potential mitigation interventions and environmental compatibility strategies.
- Ability to critically analyze literature data; development of an overall vision by integrating interdisciplinary knowledge.

Contents

The course “Sustainability and Safety of Process and Products in Different Frameworks” aims to provide theoretical and applied knowledge on how to define and quantify the impacts on human health and the environment of processes and products that may result in exposure to pollutants, with a particular focus on airborne pollutants in target populations.

Lectures are designed to provide an understanding of the complex network of interactions linking exposure to a pollutant to the onset of pathological states in humans or the environment, utilizing standard risk assessment procedures.

Detailed program

The course "Sustainability and Safety of Process and Products in Different Frameworks" aims to provide the following specific knowledge:

• Damage mechanisms produced by molecules or compounds in biological systems, with particular reference to humans;
• Interaction modalities between pollutants and a target population (workers or the general population);
• Concentration and dose as fundamental parameters for understanding population exposure;
• The concept of inherent hazard of molecules or compounds and methods for its quantification;
• Assessment methods for the effects of molecules or compounds within the general framework of a risk assessment procedure;
• Definition and assessment of effects in the context of European reference procedures (such as those defined by ECHA and EFSA);
• Definition of the SSbD (Safe and Sustainable by Design) framework and understanding of the steps for an integrated assessment of commercial properties alongside safety and sustainability evaluations.

Prerequisites

The required prerequisites are those set for admission to and enrollment in the degree program.

Teaching form

The course consists of 4 CFUs (ECTS credits) for a total of 32 hours, structured as follows:

12 2-hours lectures (24 hours total), Frontal Teaching (Delivered Didactics): delivered both in-person and remotely. Lectures may begin with standard delivered teaching but may transition into an interactive format.

4 2-hours sessions (8 hours total), Interactive Teaching (Interactive teaching): delivered in-person (and potentially grouped into 2 4-hours sessions). During these sessions, students will work under the professor's supervision to apply the concepts covered in class to theoretical or real-world case studies.

Both Frontal and Interactive teaching sessions may utilize online audience engagement tools such as Wooclap or Socrative.

Textbook and teaching resource

The course materials are mostly based on the following textbooks:

- Toxicology. The basic science of poison. Cassarett and Doull's. Mc Graw Hill Education
- Health Risk Assessment of Environmental Chemicals. Masami Ishido. Springer
- Life Cycle Analysis Based on Nanoparticles Applied to the Construction Industry. Mercader-Moyano and Porras-Pereira. Springer

Semester

I semester (October - January)

Assessment method

The final exam will be an oral interview with grades for successful evaluations between 18 and 30/laude. The oral exam is designed to verify the understanding of theoretical concepts presented in class, as well as the ability to apply them to theoretical cases. Students must demonstrate the capacity to autonomously develop and adopt the procedures taught, alongside proficiency in using appropriate disciplinary terminology.

Office hours

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

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | SUSTAINABLE CITIES AND COMMUNITIES