UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Basic of biobased processes and biorefineries

2526-102R-02

Title

Basic of biobased processes and biorefineries

Teacher(s)

Prof. Paola Branduardi

Language

English

Short description

Driven by numerous scientific discoveries in biology in the second half of the last century, biotechnology is now set to play an important role as a driver for advanced manufacturing, leveraging the power of living organisms to produce a range of goods and services. Considering this prospect, it is vital that terminology and concepts surrounding industrial and microbial biotechnology is sufficiently clear to provide a basis for a public buy-in, and for a correct support by all the complimentary discipines necessary for this crucial transition.

Table of content
What is a biomass, how we classify biomasses and the concept of cascading;

What do we mean with Biomanufacturing, Cellular agriculture, Precision fermentation, Alternative Proteins, Synthetic biology
The concept of Biorefinery and examples of strategies at different TRL (technology readiness level);
Biorefineries and Biomanufacturing: how the application of different biorefineries and biobased processes can impact on matching the 17 SDGs;
The power of microbial transformation into biobased processes: biodiversity, metabolic engineering and synthetic biology. Concepts and case studies.

The goals of this module are:
-learning how biobased processes can favour the transition from linear to circular bioeconomy;
-acquiring the concept of biorefinery and which are the sustainable resources of the Earth;
-get familiar with the definitions of some core terms, including biotechnology, biomanufacturing, engineering biology and synthetic biology
-learning how bioprocesses can help to match principles and achievements of the 17 SDGs and of the Green Deal guidelines

Target audience
PhD students with not specific knowledge or skills in biotechnology principles, but that are interested in understanding how biobased processes can leverage the change of paradigm needed to match sustainability goals.

Participants
Min 5 Max 30

Final assesment
It is divided in two sessions: i) multiple choice questions and ii) one open text question

Notes
The course style will be process-oriented and interactive. Theoretical inputs will be followed by exercises, partner work, role-plays, case studies and group-work, when appropriate. Each lesson will have focus on specific topic, with hooks with all the others. The language and the level of details will be tailored to the specific needs of the actual audience; in case of lack of basic elements or knowledge, these will be provided either by the lecturer or by providing PhD students with specific documents. During the lessons participants will receive references to the literature needed and vison papers, as well as suggestions of relevant platforms and websites that can be useful.

CFU / Hours

1 CFU / 8 hrs

Teaching period

01/12/25 9.30 am - 11.30 am U6-41
02/12/25 2 pm - 4 pm U6-25
09/12/25 9.30 am - 11.30 am U1-12
11/12/25 2 pm - 4 pm U6-39

course registration on “Segreterie online”: from 10/11/2025 to 26/11/2025

Sustainable Development Goals

ZERO HUNGER | QUALITY EDUCATION | INDUSTRY, INNOVATION AND INFRASTRUCTURE | SUSTAINABLE CITIES AND COMMUNITIES | RESPONSIBLE CONSUMPTION AND PRODUCTION | CLIMATE ACTION