



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### **New Lignin-Based Sustainable Materials: Science and Technological Aspects**

2324-1-124R009

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#### **Title**

**New lignin-based sustainable materials: science and technological aspects.**

#### **Teacher(s)**

Luca Zoia ; Ruggero Barni ; Carmen Canevali ; Antonello Cerullo ; Jerome Vachon ; Massimo Benocci

#### **Language**

English

#### **Short description**

Lignin is the second most abundant organic macromolecule in nature. Its extraction tends to increase worldwide, demanding new applications for an efficient lignin use. This course gives an overview on the whole lignin life cycle, from biosynthesis to industrial applications.

In particular, the following subjects will be developed:

- Chemistry of lignocellulosic materials
- Lignin biosynthesis, chemical structures and reactivity
- Lignin extraction processes (kraft, alkaline, organosolv)
- Main techniques in Lignin characterization (FT-IR, GPC, 31P-NMR, 13C-NMR, 2D-HSQC, EPR, SEM, ICP-AES)
- Plasma technology for lignin modification: plasma treatment aimed to surface functionalization for lignin-based composites
- Sustainability initiative in SABIC: certified polymers (biorenewable and circular polymers) and bio-based polymers (PEstarch blends and PE-lignin blends).

Evaluation: YES - oral colloquium

## **CFU / Hours**

1 CFU - 8 Hours (Lecture)

## **Teaching period**

II semester: July 2024

## **Sustainable Development Goals**

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