

**Course offered for the PhD program  
in Civil, Chemical and Environmental Engineering  
a.y. 2024/2025 (XL cycle)**

(course is open for participation of students from other PhD cycles or programs)

**1. Title**

Polymers in food and biomedical engineering

**2. Course Objectives and Description**

The course aims at providing knowledge and expertise on design, synthesis, development, and engineering of synthetic and natural polymers used in food and biomedical engineering.

The course will include the following topics:

- introduction on natural and synthetic polymers in food industry and bioengineering;
- synthesis of biopolymers (*e.g.*, microbial synthesis) and synthetic polymers (*e.g.*, click chemistry methodologies);
- techniques for the design and development of polymeric constructs (laboratory lesson);
- techniques for the characterization of polymers (laboratory lesson);
- engineering of biopolymers and synthetic polymers (classroom and laboratory lesson);
- applications of biopolymers in micro- and nanoencapsulation processes;
- applications of polymers in food packaging and regenerative medicine.

**3. Course Organization**

The course is organized in a single module with classroom and laboratory lessons.

**4. Teacher**

The teachers of the course will be Prof. Patrizia Perego and Dr. Pier Francesco Ferrari.

## **5. Duration and credits**

The course (15 hours) will consist of 3 classroom lessons (2 hours each) and 3 laboratory lessons (3 hours each), for a total of 3 credits.

## **6. Activation mode and teaching period**

The course will be held yearly if at least three students will be registered sending an e-mail to Dr. Pier Francesco Ferrari (pier.francesco.ferrari@unige.it). The course will be held at the end of June/beginning of July 2025. The exact dates of the lessons will be confirmed one month before the beginning of the course.

## **7. Deadline for registration**

Registration to the course must be made before June 15<sup>th</sup>, 2025. Students are requested to inform the teacher by e-mail about their registration.

## **8. Final exam**

The examination test will consist of a final project developed on a topic defined with the teachers.