

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

(possibility of participation for students in other PhD cycles or other PhD courses)

**1. Title**

Microalgae for carbon dioxide capture and wastewater treatment

**2. Course description**

The course aims at providing notions to the future PhD students on the growth and exploitation of microalgae for environmental purposes. The course will include the following topics.

- Microalgae: microorganism characterization and description of the main industrial growth plants (e.g.: open ponds, vertical and horizontal tubular photobioreactors, helicoidal and column photobioreactors).
- CO<sub>2</sub> capture from industrial emissions, to carry out bioenergetic studies of autotrophic metabolism;
- Microalgal mixotrophic metabolism: exploitation of microalgae to absorb and use many of the organic molecules contained in wastewaters, reducing their polluting load, leading to the production of additional microalgal biomass.
- Description of *ad hoc* plants for the growth and the collection of microalgae used for wastewater treatment.
- Laboratory activities: realization in the Environmental Biotechnology laboratory of one of the processes analyzed during the course.

**3. Course organization**

The course, organized into a single module, will consist of classroom lessons and practical laboratory training.

**4. Teacher**

The course teacher will be Prof. Alessandro A. Casazza.

**5. Duration and credits**

The course (16 hours) will consist of 4 lessons, 2 hours each, and a 8 hours tutorial in the laboratory, for a total of 3 credits.

**6. Activation mode and teaching period**

The course will be held yearly if at least one student will be registered by simple contact with teacher by email. The course will be held on June 2025. The exact dates of the lessons will be confirmed about one month before the beginning of the course.

**7. Deadline for registration**

Registration to the course must be made before March 20<sup>th</sup>, 2025. Students are requested to inform teacher by e-mail (alessandro.casazza@unige.it) about their registration.

**8. Final exam**

The final exam will consist in an interview on the topics covered by the course. The students are requested to contact teacher by email to establish the date of the exam.