

**Course offered for the PhD program  
in Civil, Chemical and Environmental Engineering  
Curriculum in Chemical, Material and Process Engineering –  
a.a. 2022/2023 (cycles XXXVIII, XXXVII e XXXVI)**

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

**1. Title**

Electrochemical energy: advanced materials and technologies.

**2. Course Description**

The course aims to provide to future PhDs notions and fundamentals on emerging materials and technologies for electrochemical energy production and storage: fuel cells, rechargeable batteries, super/ultracapacitors, electrochemical reactors for hydrogen production.

The course will deal as well with the main electrochemical techniques in continuous (cyclic voltammetry) and alternating current (impedance spectroscopy), in relation to different technologies characterisation.

**3. Course Organization**

The course, organized into a single module, will consist of classroom lessons and practical laboratory training. It will be held in English.

**4. Teacher**

The course teacher will be Prof. M. Paola Carpanese.

**5. Duration and credits**

The course (18 hours) will consist of 5 lessons, 3 hours each, and a 3 hours tutorial in the laboratory, for a total of 3 credits.

**6. Activation mode and teaching period**

The course will be held in February-March 2023 and a detailed calendar for lessons will be given to registered students.

**7. Deadline for registration**

Registration to the course must be made before January 31th, 2023. Students are requested to inform teacher by e-mail ([carpanese@unige.it](mailto:carpanese@unige.it)) about their registration.

**8. Final exam**

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