Course unit English denomination	Modern synthetic approaches to radical chemistry
Teacher in charge (if defined)	DELL'AMICO Luca , GOTI Giulio
Teaching Hours	24
Number of ECTS credits allocated	3
Course period	06-07/2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The aim of the course is to provide an overview of the most recent developments in the field of radical chemistry towards the construction of Carbon-Carbon and Carbon-Heteroatom bonds. Specifically, the course will be centered around the following research topics: - Overview of radical chemistry, including traditional generation strategies, radical nature/philicity, stability and properties. - Modern synthetic approaches to generate radical intermediates with particular emphasis on catalytic approaches such as photo- and electrocatalysis. - Stereo- and enantioselective versions of classical radical reactivity (stereoselective photocatalysis and metal-catalysis) - Application of these strategies for the synthesis of important building blocks and/or pharmaceuticals. - Alternative applications of radical reactions will be also discussed, including: applications in material science, drug discovery and agrochemistry.
Learning goals	**Knowledge**: Students will acquire in-depth understanding of the fundamental principles and modern theories of radical chemistry. These include: - Radical properties (philicity, persistence, stability) - Classical and modern radical generation strategies (mechanisms such as HAT, XAT, SET, and their integration into catalytic systems). - Emerging techniques (Photocatalysis, electrochemistry, and photo-electrochemistry as advanced strategies for radical generation). - Technological applications (use of flow chemistry in photocatalytic and electrochemical processes). **Skills**: Students will develop the ability to apply their knowledge to solve complex problems and perform advanced tasks, such as designing and optimizing reactions involving radical intermediates, applying photocatalytic, electrochemical, and photo-electrochemical methods to radical generation and reaction development. **Competencies**: Students will demonstrate the capacity to critically evaluate and adapt modern radical chemistry techniques in research and industrial contexts. They will be able to integrate theoretical knowledge with experimental skills to address complex

	synthetic challenges in radical chemistry. Moreover, they will acquire competencies to actively collaborate and innovate within multidisciplinary teams, leveraging cutting-edge technologies like flow chemistry to develop sustainable and efficient chemical processes.
Teaching methods	Frontal teaching
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No Students external to the PhD Course admitted upon evaluation of the CV by the teachers
Prerequisites (not mandatory)	max 3750 caratteri
Examination methods	The students will receive a research article from the literature related to the topics encountered during the course. Each student will discuss the work (10 minutes ppt presentation) followed by questions and curiosities from the audience (10 min).
Study material	Slides/articles provided by the teacher
Additional information (not mandatory)	max 3750 caratteri