



Course unit English denomination	Transition metal catalysis for fine chemistry
SSD	CHEM-03/A
Teacher in charge (if defined)	BIFFIS Andrea (6h), TUBARO Cristina (6h), ZECCA Marco (6h), BARON Marco (6h)
Teaching Hours	24
Number of ECTS credits allocated	3
Course period	09/2026
Course delivery method	<input type="checkbox"/> In presence <input type="checkbox"/> Remotely <input checked="" type="checkbox"/> Blended
Language of instruction	English
Mandatory attendance	<input checked="" type="checkbox"/> Yes (75% minimum of presence) <input type="checkbox"/> No
Course unit contents	<p>The aim of this course is to introduce the students to the use of transition metal catalysts in homogeneous catalysis.</p> <p>In the first part of the course, the following general topics will be presented in detail:</p> <ul style="list-style-type: none">- introduction to chemical kinetics; kinetic nature of the catalytic action.- reaction mechanisms and kinetic laws for stoichiometric and catalytic reactions.- typical (pseudo)elementary reactions in homogeneous organometallic catalysis: oxidative addition, reductive elimination, migratory insertion, β-elimination.- carbene coordinated to transition metals: Schrock vs. Fischer type carbenes. <p>Subsequently, the concepts learned in the first part of the course will be applied to the rational understanding of the role played by transition metal centres as catalysts for selected chemical reactions, including but not limited to:</p> <ul style="list-style-type: none">- olefin metathesis.- C-C coupling reactions, with details on the Heck reaction.- aromatic C-H bond functionalization.- catalytic transformations of substrates containing multiple C-C bonds: alkenes, alkynes, allyls, dienes, dienyls, arenes.- catalytic transformations involving renewable feedstocks.
Learning goals	<p>Knowledge: knowledge of transition metal complexes and their reactivity in the presence of organic substrates.</p> <p>Skills: Understanding the factors affecting the reactivity of a metal complexes and its role as catalyst.</p> <p>Competencies: Achieving know-how on the rational use of transition metal complexes as catalysts for selected reactions relevant to fine chemical synthesis</p>



Teaching methods	Frontal teaching
Course on transversal, interdisciplinary, transdisciplinary skills	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Available for PhD students from other courses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Students external to the PhD Course admitted upon evaluation of the CV by the teachers
Prerequisites (not mandatory)	max 3750 caratteri
Examination methods	Test with multiple choice questions on course topics. The test will be considered passed with at least half correct answers.
Suggested readings	Slides/articles provided by the teacher
Additional information (not mandatory)	max 3750 caratteri