

60454 - Fundamental methodologies in synthesis

Syllabus Information

Academic year: 2024/25

Subject: 60454 - Fundamental methodologies in synthesis

Faculty / School: 100 - Facultad de Ciencias

Degree: 543 - Master's in Molecular Chemistry and Homogeneous Catalysis

ECTS: 2.0

Year: 1

Semester: First semester

Subject type: Optional

Module:

1. General information

The subject aims to offer students the possibility of broadening their experimental skills in chemical synthesis, regardless of their previous experience. Students will carry out synthetic procedures using the techniques and methodologies of research laboratories. As a result, they will improve their critical analysis skills, both for procedures and data, and their ability to present results. All this will result in an important benefit for their incorporation to chemical research laboratories, either within a research environment or for their entry into the labour world.

2. Learning results

Skill in the use of the material, basic equipment and the usual working techniques in a chemical synthesis research laboratory.

Knowledge of the Health and Safety Standards of a research laboratory in chemical synthesis.

Observation and decision making skills.

Ability to design organic and inorganic synthesis strategies in the preparation of chemical compounds.

Ability to relate theoretical concepts acquired in their training with the observed experimental facts.

Ability to prepare reports with scientific rigor, as well as to interpret and analyse results.

3. Syllabus

Fundamental Synthesis Methodologies is an experimental subject that includes 5 activities to be developed in several laboratory sessions. These activities will be:

1.- Synthesis, purification and characterization of a 4-arylidinoxazolone.

2.- Assessment of an organomagnesian.

3.- Preparation, isolation and characterization of N-Boc diphenylprolinol.

4.- Synthesis and characterization of nickel complexes.

5.- Synthesis and characterization of molybdenum complexes.

4. Academic activities

Sessions of 3.5 h of laboratory work: the synthesis of various products that require the usual synthetic methodologies of research laboratories will be proposed: work in inert atmosphere, vacuum line, anhydrous solvents, work with Schlenk techniques as well as isolation and purification techniques. Reactions requiring monitoring and purification by chromatography, as well as characterization by infrared spectroscopy and nuclear magnetic resonance will be conducted.

Preparation of a report: writing of a report to record the synthetic procedures carried out and the characterization of the products prepared.

5. Assessment system

The continuous assessment of this subject is based on the following criteria with the weighting indicated:

1.- Assessment of experimental ability (quality of the work performed and results obtained), 40%.

2.- Laboratory notebook, 10%.

Laboratory report, 50%.

Students who have not passed this type of assessment or who wish to improve their grade may take a global theoretical-practical test in which they will have to demonstrate they have achieved the learning results foreseen in the subject. This test will be held on both the first and second calls, and will be announced with due notice.

The number of official exams to which the registration entitles the student (2 per registration) as well as the use of these calls

will be in accordance with the *Rules of Permanence in Master's Studies* and the *Rules for the Evaluation of Learning* (<https://ciencias.unizar.es/normativas-asuntos-academicos>). The general criteria for the design of the tests and the grading system shall also be adjusted to the latter regulation, and the time, place and date of the review shall be made public when the grades are published.

6. Sustainable Development Goals

- 4 - Quality Education
- 9 - Industry, Innovation and Infrastructure
- 12 - Responsible Production and Consumption