

Design and Synthesis with Laboratory

Course of Study: Degree in Chemical Science

Learning Credit: 6 CFU (4+2)

Compulsory Attendance: only for the laboratory experiences (2CFU)

Teaching language: Italian language, didactic English support for Students from foreign Countries (Erasmus, etc.).

Schedule of Lectures: lectures are scheduled from 2nd March to 5th June 2015

Evaluation Methods: The final examination will consist in an oral examination. Student achievement is measured and evaluated by:

- The ability in understanding the field and concepts of heterocyclic chemistry;
- The ability to identify the synthesis of heterocyclic compounds;
- The ability to apply the knowledge to research.

Prerequisites: a good background of general inorganic and organic chemistry principles and concepts.

Mode of Delivery: lectures (32h) accompanied by laboratory experiences (24 h) aimed at strengthening the theoretical foundations; direct involvement of students in the development of theoretical subjects and exercises. Lecturing, Self-study, group discussion and presentation

Expected Results: after successful completion of this course, students should be able to: a) understand the field and concepts of heterocyclic chemistry; b) identify the synthesis of heterocyclic compounds; c) apply the knowledge to research.

Learning Outcome: the goal of this course is to give knowledge about the nomenclature and the main reactions (synthesis and reactivity) of the most popular heterocyclic rings with a particular attention to the 5-10 membered ring compounds containing at least one or two heteroatoms.

Content of the Program/Course: synthesis and reactivity of major classes of heterocyclic compounds are covered in detail, with emphasis on recent advances in synthesis and reaction development. Nomenclature of heterocycles: replacement and systematic nomenclature for monocyclic, fused and bridged hetero cycles. Structure, properties, synthesis and reactions of 5-10 member heterocyclic ring of heterocyclic compounds, including pyrroles, furans, thiophenes, pyridines, their benzofused analogues and related compounds, such as oxazoles, imidazoles and pyrimidines, with more than one heteroatom. Special attention is given to outline the role of heterocycles as synthetic intermediates, as moieties in molecules of pharmaceutical and biological importance especially in natural products.

Laboratory Work (2CFU): the laboratory practices are focused on the oxidation of an alcohol functional group using both a traditional and eco-friendly approach (aerobic oxidation).

Office hours: by appointment via email (porcheddu@unica.it) every Tuesday from 3:00 p.m. until 5 p.m.

Recommended or required reading and course materials:.

1. T. Eicher, S. Hauptmann, *The Chemistry of Heterocycles*, 2nd ed., Wiley-VCH.
2. *Chimica dei Composti Eterociclici*, Donato sica e Franco Zollo, Edises.
3. M. Sainsbury; *Herocyclic Chemistry*, RSC.
4. J. A. Joule and K. Mills; *Heterocyclic Chemistry*, Blackwell Science, 2000.