

60650 - Metrology in the Chemistry Laboratory

Syllabus Information

Academic Year: 2019/20

Subject: 60650 - Metrology in the Chemistry Laboratory

Faculty / School: 100 -

Degree: 540 - Master's in Industrial Chemistry

ECTS: 3.0

Year: 1

Semester: Second semester

Subject Type: Optional

Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. It is based on:

- M1: Lectures: large group sessions.
- M2: Practice sessions in small groups.
- M3: Autonomous work and study.

That favor the development/acquisition of:

- C1: Trazability evaluation of analytical methods.
- C2: Uncertainty evaluation of analytical methods.
- C3: Using the analytical results uncertainty for problem solving in the chemical industry.

A wide range of teaching and learning tasks are implemented, such as: lectures, problem solving and case study, computer case study and workshop of cases studies.

Students are expected to participate actively in the class throughout the semester.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials, including a discussion forum.

Further information regarding the course will be provided on the first day of class.

4.2.Learning tasks

This is a 3 ECTS course organized as follows:

- AF1 (1ECTS: 10h) Lectures.Acquisition of the knowledge needed in Chemical Metrology.
- AF2 (1 ECTS: 10h): Problem solving and case study.
- AF3 (0,7 ECTS: 7h): Computer case study.
- AF4 (0,3 ECTS: 3h): Workshop of cases studies prepared by the students.

4.3.Syllabus

The course will address the following topics:

Lectures

Section 1. Core Concepts in Chemical Metrology: techniques, methods, measurement systems and traceability.

Section 2. Accuracy and uncertainty.

Section 3. Uncertainty calculation in simple chemical systems

Section 4. Uncertainty calculation in complex analytical systems

Section 5. Instrumental uncertainty:noise

Section 6. Basical elements of statistical inference

Section 7. Univariate linear calibration of analytical method.

Section 8. Univariate non-linear calibration of analytical methods.

Section 9. Multivariate calibration of analytical methods.

Section 10. Proficiency Testing of professional laboratories.

4.4.Course planning and calendar

The subject will be taught in the second semester.

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the "Facultad de Ciencias?website (<https://ciencias.unizar.es/calendario-y-horarios;>)

4.5.Bibliography and recommended resources

Other resources

- Excel ®
- Unscrambler 7.0 ®
- Classroom materials