

- Course title: **Advanced Instrumental Analysis.**
- Course code: 5293
- Type of course: compulsory
- Level of course: fundamental
- Year of study: 3
- Semester: 2
- Number of credits allocated: 3
- Names of lecturers: Olga Domínguez and Álvaro Colina.
- Objective of the course:
 - Describe general aspects of some advanced analytical techniques.
 - Distinguish instrumental techniques based on the same principles.
 - Recognize basic instrumentation.
 - Describe schematic diagrams of the techniques.
 - Interpret data registered with these techniques during basic experiments.
 - Select the proper instrumental technique to analyze a simple sample.
- Prerequisites: It is recommended that students should have attended Instrumental Analysis before following this course.
- Course contents: sensors: fundamentals, optical sensors, electrochemical sensors; mass spectrometry: fundamentals and instrumentation; coupled techniques: detectors in chromatography, ICP-OES, ICP-MS; automatic techniques: fundamentals, classification and instrumentation; thermal analysis: thermogravimetry, differential thermal analysis, differential scanning calorimetry; radiochemical methods: radioactive isotopes, neutron activation analysis, isotopic dilution; X-ray methods: fundamentals, absorption, fluorescence, diffraction; surface analysis: X-ray photoelectron spectroscopy, Auger electron spectroscopy, electronic microscopy, scanning probe microscopy.
- Recommended reading:
 - D.A. Skoog, F.J. Holler, S.R. Crouch (2007) Principles of Instrumental Analysis, 6^a ed, Thomson, USA
 - R.D. Braun (1987) Introduction to Instrumental Analysis, McGraw-Hill, New York
 - R.P.W. Scott, (1997) Tandem Techniques, John Wiley & Sons, Ltd., Chichester.
 - B.R. Eggins, (2002) Chemical Sensors and Biosensors, John Wiley & sons, Chichester.
 - D.J. O'Connor; B.A. Sexton; R.St.C. Smart (Eds.), (2003) Surface analysis methods in materials science, Springer-Verlag.
 - E. de Hoffmann; V. Stroobant, (2003) Mass spectrometry: principles and applications, John Wiley & Sons.
- Teaching methods:
 - Lectures: teachers explain the contents of the lessons.
 - Seminars: students and teacher discuss the problems and other points raised in class.
- Assessment methods:
 - Participation and attitude in lectures and seminars: 10 %
 - Resolution of problems, issues and other proposals: 20 %
 - Group and individual work: 20 %
 - Written work and exams: 50 %
- Language of instruction: Spanish and/or English