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COURSE MODULE INFORMATION

CH326: Analytical Chemistry & Molecular Structure

Semester 1 | Credits: 5

A variety of analytical techniques and their application will be covered. Also included will be methods (e.g. NMR, IR, MS, X-ray crystallography) which are used in structure determination of chemical compounds. This is a theory based module. A practical component related to this module will run parallel with this course (Experimental Chemistry I).

(Language of instruction: English)

Learning Outcomes

1. Understand the basic principles and main components of important surface analytical techniques such as SEM-EDX, SIMS and XPS and be able to interpret the chemical and structural data obtained using these techniques.
2. Understand the basic concepts of crystallography such as crystal systems and Bravais lattices and have the ability to index simple X-ray powder diffraction patterns and to calculate unit cell parameters and densities from X-ray powder data.
3. Relate their knowledge of the theory and instrumentation of gas-liquid chromatography to the design of a variety of separations.
4. Explain the theory of X-ray Fluorescence spectroscopy and the origin of the spectral lines.

5. Describe the basic experimental and theoretical issues involved in obtaining an NMR spectrum and to deduce the structure of a molecule on the basis of information obtained from its ^1H - and ^{13}C - NMR spectra.
6. Understand the theoretical principles, instrumentation, operation and data interpretation of thermogravimetry and differential scanning calorimetry. They will also understand the theoretical principles and applications of gas sensors based on electrochemical and combustion methods.
7. Explain the machinery and chemical basis behind mass spectrometry including ion generation, separation, detection and the fragmentation mechanisms and be able to apply mass spectra to the analysis of known and unknown compounds.
8. Describe the operation of analytical HPLC instruments in relation to pumping systems, injection valves, columns and detectors and to identify the key features in HPLC applications relating to the analysis of pharmaceuticals and related materials.

Assessments

i This module's usual assessment procedures, outlined below, may be affected by COVID-19 countermeasures. Current students should check Blackboard for up-to-date assessment information.

- Written Assessment (90%)
- Continuous Assessment (10%)

Module Director

- Olivier Thomas: [Research Profile](#) | [Email](#)

Lecturers / Tutors

- JUDY BUCKLEY: [Research Profile](#)
- KAREN KELLY: [Research Profile](#)
- PATRICK O'LEARY: [Research Profile](#)
- ALAN RYDER: [Research Profile](#)
- ANDREA ERXLEBEN: [Research Profile](#)
- Olivier Thomas: [Research Profile](#)

The above information outlines module CH326: "Analytical Chemistry & Molecular Structure" and is valid from 2016 onwards.

Note: Module offerings and details may be subject to change.

ABOUT NUI GALWAY

Founded in 1845, we've been inspiring students for 175 years. NUI Galway has earned international recognition as a research-led university with a commitment to top quality teaching.



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