Module Title:
Flow injection analysis

Module Code:
AM0918

Maximum Number of Students:
20

Total ECTS Credits
2

Notional Learning Hours
(a) Contact Time - 10 h
(b) Private Study - 40 h

Format of Teaching:

Lectures	10 h
Laboratories or Practicals	0 h
Other	0 h

Teaching Strategy:
Formal lectures in 60/90 min timetable

Convener:

Javier Saurina

University / Department:

University of Barcelona, Department of Analytical Chemistry

Language of Tuition:
English

Module Description - The Purpose or Aims:

1. To introduce the fundamentals of flow injection analysis and related techniques
2. To illustrate representative applications of flow injection analysis and derivative branches

Specific Learning Outcomes for this module: (contributing to general learning outcomes GLO 1 – GLO 10)
At the end of the module the learner is expected to be able to:

1. understand the principles and basic components of a conventional flow-injection method, with special attention in advantages and shortcomings
2. know the relevant features of derivative branches including sequential injection, bead injection and microfluidic systems
3. know the possibilities of flow method for on-line sample treatment, derivatization and coupling instrumental devices
4. critically understand the performance of flow-injection methods in multicomponent analysis
5. adapt and implement a classical batch analytical method to a flow-injection system

Summary of Course Content:
This module is focused on providing a general introduction to flow-injection analysis and related flow methods. Special attention is paid in giving a preliminary description of the historical context and the evolution throughout last decades. Advantages and shortcoming regarding automation, miniaturization, versatility and other relevant features will be discussed. Basic components and pieces for assembling the flow manifold as well as detection devices will be described. Beyond the classical mode, derivative branches such as sequential injection, bead injection and microfluidic systems and gradient manifold will also be introduced. The integration of diverse elements in a common flow system for connecting on-line sample processing, derivatization and instrumental coupling will be remarked. The significance of flow-injection for multicomponent analysis will be also pointed out, with special attention on strategies for gaining selectivity for each analyte. Finally, selected examples will be given to illustrate the potentiality and performance of flow injection analysis in different fields (e.g., food, clinical, environmental and pharmaceutical analysis).

Transferable Skills Taught:
Communication:
Writing chemical analysis reports

Information Technology:
Software programing for instrumentation and data analysis

Assessment Methods:

1. LO1 to LO5 – Written Exam (100%)

Assessment Criteria:

Threshold

LO1 – to know the fundamentals of conventional flow-injection analysis
LO1 – to describe the general components of flow systems and design basic flow manifold schemes
LO1 – to know the principal flow cell systems and detection devices

Good

LO2 – to know the main derivative branches including sequential injection and bead injection analysis
LO3 – to be able to combine and integrate components in a common set-up for on-line implementation of various steps of the method, including sample treatment, reaction, detection and data analysis

Excellent

LO3 – to understand the fundamentals of coupling flow manifolds and separation techniques (liquid chromatography and capillary electrophoresis)
LO4 – to recognize the different types of analytical data that can be generated and identify proper techniques for extracting information from these data sets
LO5 – to know and evaluate critically the applicability of flow methods to multicomponent analysis

Resource Implications of Proposal and Proposed Solutions:

Lecture notes will be available for students.
Recommended reading:
[1] J. Ruzicka, E.H. Hansen, *Flow Injection Analysis*, 2nd ed., John Wiley and Sons, New York, **1988**.
[2] M.Trojanowicz, *Flow Injection Analysis: Instrumentation and Applications*, World Scientific, River Edge, New Jersey, **1999**

Pre-Requisites:

No pre-requisites are required.