

Module Title: Atomic Spectroscopy
Module Code: AM0910
Maximum Number of Students: 20
Total ECTS Credits 2
Notional Learning Hours (a) Contact Time - 13h (b) Private Study - 37h
Format of Teaching: Lectures 7 h Laboratories or Practicals 6 h Other 0 h
Teaching Strategy: Formal lectures in 60/90 min timetable. One full day (6h) of Laboratory Practicals.
Convener: I. Cavaco
University: University of Algarve
Language of Tuition: English
Module Description - The Purpose or Aims: <ol style="list-style-type: none"> 1. To introduce fundamental concepts of Atomic Spectroscopy (AS) 2. To introduce the instrumentation used in the most common AS techniques: Flame and Electrothermal Atomic Absorption Spectroscopy; Plasma Emission Atomic Spectroscopy. 3. To introduce the sources of error and methods for validating results in AS.
Learning Outcomes: At the end of the module the learner is expected to be able to: <ol style="list-style-type: none"> 1. correctly identify and describe the principles and instrumentation in the main AS techniques 2. Select the most adequate AES technique for the analysis of a given system 3. Critically analyse and evaluate results from AS 4. Correctly develop an analytical method and a procedure for validating results in AES.
Summary of Course Content: This module introduces concepts of fundamental AS. It then explores the most widely used AS techniques: Flame and Electrothermal Atomic Absorption Spectroscopy; Plasma Emission Atomic Spectroscopy. For each technique, the principles, instrumentation, limitations and typical applications are presented.
Transferable Skills Taught: Laboratory skills: adjusting and using equipment for Atomic Spectroscopy.
Assessment Methods: <ol style="list-style-type: none"> 1. LO1 – LO4 – Laboratory report.

Assessment Criteria:Threshold

- LO1 – to correctly describe the components of a given AS system
- LO2 – to identify the main AS techniques and when they can be applied
- LO3 – to correctly calculate efficiency parameters for an atomic spectrophotometer
- LO4 – to correctly perform a AS analysis using a method already implemented.

Good

- LO1 – to correctly identify a AS equipment and define what type of analysis it can perform
- LO2 – to be able to choose the most adequate AS technique to perform the analysis of a given sample
- LO3 – to correctly analyse the efficiency of a AS system and design solutions to increase its performance
- LO4 – to develop and optimise an AS method for a given analysis

Excellent

- LO1 – to correctly identify the parts of any AS equipment and define what type of analysis can be performed in each equipment
- LO2 – given a set of samples, to choose the best available AS techniques to analyse each sample
- LO3 – to develop a laboratory quality control plan for AS equipment, based on the efficiency of each equipment
- LO4 – to develop and optimise a AS method for a given analysis.

Resource Implications of Proposal and Proposed Solutions:

Lecture notes will be available for students.

Recommended reading:

- "Quantitative Chemical Analysis", Daniel C. Harris, Freeman, 6th ed., 2003.
- "Analytical Chemistry", R. Kellner, J.M. Mermet, M. Otto, H.M. Widmer, Wiley-VCH Verlag, Weinheim, Germany, 1998.
- "Principles of Instrumental Analysis", D.A. Skoog, F.J. Holler, T.A. Nieman, 5th ed., Saunders College, Florida, 1998
- "Chemical Analysis – Modern Instrumentation Methods and Techniques", F. Rousseac, A. Rousseac, Wiley, 2000
- "Analytical Instrumentation – Performance, Characteristics and Quality", G. Currell, Wiley, 2000.