Module Title:
Voltammetric and Chronopotentiometric techniques

Module Code:
AM0921

Maximum Number of Students:
20

Total ECTS Credits
2

Notional Learning Hours
(a) Contact Time - 15h
(b) Private Study - 35h

Format of Teaching:

Lectures	10 h
Laboratories or Practicals	5 h
Other	0 h

Teaching Strategy:
Formal lectures in 60/90 min timetable. Two 2h 30m laboratory practicals.

Convener:
J.P. Pinheiro

University:
University of Algarve

Language of Tuition:
English

Module Description - The Purpose or Aims:

1. To describe the fundamental concepts of dynamic electrochemical techniques.
2. To introduce analytical voltammetric and chronopotentiometric techniques, in direct and stripping modes, their operation and applications.

Learning Outcomes:

At the end of the module the learner is expected to be able to:

1. understand the fundaments of dynamic electrochemical measurements and their practical application
2. correctly identify and describe the principles of operation and instrumentation in voltammetric and chronopotentiometric techniques
3. critically analyze and evaluate the results of a voltammetric and chronopotentiometric measurements especially the associated errors.

Summary of Course Content:
Kinetics of electrode reactions. Mass transfer by diffusion.
Voltammetric techniques: potential step and potential sweep methods.
Chronopotentiometric techniques.
Methods involving forced convection – Hydrodynamic methods.
Stripping Techniques – voltammetric and chronopotentiometric modes.

Transferable Skills Taught:

Communication:
Writing chemical analysis reports

Information Tecnhology:
Literature search tools and methodologies

Assessment Methods:

1. LO1 – Written Examination (40%)
2. LO2 – Laboratory Work Assignment (30%)
3. LO3 – Literature search assignment (30%)

Assessment Criteria:

Treshold
LO1 – to understand the concept of dynamic electrochemical measurements and their practical application
LO2 – to understand the principles of operation analytical voltammetric and chronopotentiometric techniques, in direct and stripping modes
LO3 – to correctly perform a voltammetric or chronopotentiometric analysis using a method already implemented
LO4 – to be able to find relevant literature to set up a voltammetric or chronopotentiometric analysis methodology for a given sample

Good
- the Treshold plus:
LO5 – to develop and optimize a a voltammetric or chronopotentiometric method for a given analysis

Excellent
- the Treshold and Good plus:
LO6 – to be able to compare the advantages and drawbacks of voltammetric techniques relative to the chronopotentiometric techniques for a given analysis,

Resource Implications of Proposal and Proposed Solutions:

Lecture notes will be available for students.
Recommended reading:
Basic:
"Electrode Dynamics", Giles H.W. Sanders, Oxford Chemistry Primers, Oxford Science, 1996
Advanced:
''Electrochemical Methods: Fundamentals and applications", A.J. Bard, L.R. Faulkner, Wiley, 2nd ed. 2001.''
"Electroanalytical Methods: Guide to experiments and applications", F. Scholz (Ed.), Springer, 2002