

Module Title: Sensors and Biosensors
Module Code: AM0916
Maximum Number of Students: 20
Total ECTS Credits 2
Notional Learning Hours (a) Contact Time - 10 h (b) Private Study - 10 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: J.M. Palacios
University: University of Cádiz
Language of Tuition: English
Module Description - The Purpose or Aims: <ol style="list-style-type: none"> To introduce fundamentals of sensors and their main applications To introduce fundamentals of biosensors and their main applications To discuss and analyze several scientific publications regarding the state-of-the-art of this module
Learning Outcomes: At the end of the module the learner is expected to be able to: <ol style="list-style-type: none"> Define appropriately sensor and biosensor Correctly identify sensors and biosensors Select the adequate type of sensors/biosensors for certain analysis
Summary of Course Content: Simple sensors become an increasingly attractive tool for monitoring harmful substances, for quality control, and in medicinal and environmental chemistry. Chemical sensors based on electrochemical principles (voltammetry, potentiometry) and optical sensors are between the most important, mainly because of the low cost of manufacture. Membrane designs and modifications facilitate immobilization of all required chemicals within the sensor resulting in easy handling and operation. At this point, biosensors acquires relevant role: their potential applications cut across the analytical landscape from the environment to the brain. Nevertheless, each analytical problem requiring a specific type of biosensor is unique, yet there are integrating principles of design and operation that bring some degree of cohesion to the field as a whole. Besides, new legislations and regulations are opening doors to biosensors in many fields, such as food industry, thanks to the possibility to operate in real samples with less or no pretreatment as well as the incorporation to on-line monitoring.

Transferable Skills Taught:*Communication:*

To be able to recognize and describe a sensor/biosensor and its possible application

Interpersonal skills:

Elaborate and show a group written assignment

Assessment Methods:

1. LO1 – Written Examination (30%)
2. LO2 – Group Work Discussion (30%)
3. LO3 – Work assignment (40%)

Assessment Criteria:Threshold

LO1 – to correctly distinguish between sensors and biosensors

LO2 – to know the applicability of different types of sensors and biosensors

LO3 – to identify the main characteristics of a sensor/biosensor

Good

LO1 – to apply adequately the principles and concepts concerning sensors and biosensors

LO2 – to connect the applicability of a sensor or biosensor with its structure

LO3 – to connect the characteristics of a sensor/biosensor with an analytical problem

Excellent

LO1 – to be able to describe the main advantages of a sensor/biosensor related to certain analytical problem

LO2 – to be able to think up an application for a determined sensor or biosensor

LO3 – to be able to select the best sensor or biosensor for certain analysis

Resource Implications of Proposal and Proposed Solutions:

Lecture notes will be available for students.

Recommended reading:

"Principles of Chemical Sensors", J. Janata, Plenum Press, New York, 1989

"Introduction to Bioanalytical Sensors", A. J. Cunningham, John Wiley & Sons, Inc, New York, 1998

"Biosensor and Modern Biospecific Analytical Techniques", L. Gorton, Elsevier, The Netherlands, 2005