UNIVERSITY OF PUERTO RICO AT ARECIBO
PHYSICS/CHEMISTRY DEPARTMENT
BACHELOR OF TECHNOLOGY IN INDUSTRIAL CHEMICAL PROCESSES

Course N°: QUIM 4012

Title of Course: Instrumental Analysis Laboratory

Credits: 0

Contact Hours: 3/weekly

Open to: Industrial Chemical Processes Technology students

Pre- requisite: none

Co-requisite: QUIM 4011

Textbook: Instrumental Analysis Laboratory Manual

Author: Ricardo Infante-Castillo

Publisher: UPRA

Publication Year: 2008

Other Supplemental Materials:

- Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Stanley R. Crouch, Thomson. Brooks/cole. 2007.
- Fundamentals of Analytical Chemistry, Douglas A. Skoog, F. James Holler, Stanley R. Crouch. Thomson. Brooks/cole. 2004.
- Contemporary Instrumental analysis, Kenneth a. Rubinson, Judith F. Rubinson, Prentice Hall, 2000.

Term: Second Semester

Course Coordinator: Dr. Ricardo Infante

Course Description:

Qualitative and quantitative analysis practices using atomic and molecular spectroscopic methods. Includes chromatography and other current topics in instrumental analytical chemistry.

Course Objectives:

- Identify, calibrate and operate instruments for qualitative and quantitative analysis such as refractometer, polarimeter, UV-Vis spectrophotometers, AA-flame, ATR-IR, GC, HPLC
- Describe the key components of the instruments most used for chromatographic, atomic spectroscopy and molecular spectroscopy studies and execute properly SOP's for obtained accuracy results
- Apply the scientific method in the assessment and evaluation of experimental results.
- Communicate the analytical results in appropriate fashion by preparing technical reports related to laboratory experiments.
- Select suitable instrumental methods for a given application, taking into consideration sample considerations, as well as the accuracy, precision and limit of detection of the techniques, among other criteria.

Relation of Course to Program Objectives:

1	2	3	4
x	x	x	

Relation of Course to Program Outcomes:

1	2	3	4	5	6	7	8	9	10	11
x	x	x	x	x	x	x				

Evaluation/Grade Reporting: 1 final exam (20% each), laboratory reports (60%), laboratory notebook (10%), aboratory work (10%)

Topics	Teaching/Learning Strategies Time Distribution (hours)
1. Introduction and statistical analysis	Computer-based lecture and team work (6)
2. Refractometry	Introduction lecture, Basic description of instrument, SOP's execution, Evaluation of the use of the instrument Team work (4)
3. Polarimetry	Introduction lecture; Basic description of instrument; SOP's execution, Evaluation of the use of the instrument; Team work (4)
4. UV-Vis spectroscopy	Introduction lecture; Basic description of instrument ; SOP's execution; Evaluation of the use of the instrument; Team work (8)
5. ATR-IR spectroscopy	Introduction lecture; Basic description of instrument ; SOP's execution; Evaluation of the use of the instrument; Team work (4)
6. Atomic absorption	Introduction lecture; Video simulation; Basic description of instrument; SOP's execution; Evaluation of the use of the instrument; Team work (4)
7. HPLC	Introduction lecture; Basic description of instrument; SOP's execution; Evaluation of the use of the instrument; Team work (8)
8. GC	Introduction lecture; Basic description of instrument ; SOP's execution; Evaluation of the use of the instrument, Team work (8)
Total	45