



University of Puerto Rico
Mayagüez Campus
College of Arts and Sciences
Department of Chemistry



A. COURSE SYLLABUS QUIM3025L (FALL 2015)

1. General Information:

Course Title: ANALYTICAL CHEMISTRY I LABORATORY

Course Number: QUIM-3025L

Section: multiple

Date: Sem. I 2015-16

Coordinator: Jose L Vera, Ph.D.

e-mail: jose.vera2@upr.edu

Instructor: _____

Phone _____

Office: _____ e-mail: _____

Office Hours: _____

2. Course Description: One four-hour laboratory per week. Practical experience in the fundamental topics of analytical chemistry. Emphasis will be given to general concepts of quantitative chemical analysis including volumetric, gravimetric analysis and chemical equilibrium.

3. Pre-requisites: QUIM-3002, QUIM-3042

4. Textbook, Supplies and Other Resources:

Primary Texts:

- Vera, M.; Padovani J. I.; De Jesús, M. A.; Areizaga, H. I.; *Analytical Chemistry I Laboratory Manual*; UPRM online resource: <https://ecourses.uprm.edu/course/index.php?categoryid=331> (QUIM3025 Analytical chemistry I Laboratory).
- Harris, D.C. *Quantitative Chemical Analysis*, 8th.ed; W.H. Freeman: New York, 2010.

Additional Resources:

- Journal: UPRM-Databases; <http://www.uprm.edu/library/cre/listdbsp.php?l=1&st=15&sh=15>

5. Purpose: This is a core course for undergraduate students pursuing a B.S. in Chemistry.

6. Course Goals:

- Develop the statistical and analytical skills of the students.
- Provide a practical experience in the use of routine analytical equipment.
- Prepare students to perform and interpret results from volumetric, gravimetric, potentiometric, spectrophotometric analyses.
- Improve the student's skills in the preparation of analytical solutions for a quantitative analysis.
- Improve the oral and written communication skills of our students, by means of written reports and oral presentations.

7. Requirements:

All students are expected to:

- Complete the assigned readings, reports, exercises, and additional coursework efficiently and in a timely manner.
- Attend to all lectures and be punctual. ***Three or more absences will result in a total loss of credit (F) in the course.***
- Approve all coursework in order to receive full credit for the class.

8. Department/Campus Policies:

8a. Class attendance: Class/laboratory attendance is compulsory. The University of Puerto Rico, Mayagüez Campus, reserves the right to deal at any time with individual cases of non-attendance. Professors are expected to record the absences of their students. ***Therefore, frequent absences could affect the final grade.*** Arranging to make up work missed because of legitimate class absence is the responsibility of the student. ***Absences to three (3) or more laboratory experiments will automatically result in an F in the Quim 3065 course.***

8b. Absence from examinations: Students that fail to present the laboratory final exam will receive a score of zero points in the exam. Please refer to the *Evaluation/Grade Reporting Section* included in this Syllabus.

8c. Final examinations: Final written examinations must be given in all courses unless, in the judgment of the Dean, the nature of the subject makes it impractical. Final examinations scheduled by arrangements must be given during the examination period prescribed in the Academic Calendar, including Saturdays.

8d. Partial withdrawals: A student may withdraw from individual courses at any time during the term, but before the deadline established in the University Academic Calendar.

8e. Complete withdrawals: A student may completely withdraw from the University of Puerto Rico, Mayagüez Campus, at any time up to the last day of classes.

8f. Disabilities: All the reasonable accommodations according to the Americans with Disability Act (ADA) Law will be coordinated with the Dean of Students and in accordance with the particular needs of the student. **According to Law 51:** Students with disabilities must contact and make formal arrangements with UPRM officials, faculty and instructors to request any special accommodations during an exam or course work. For more information please contact the Dean of Students Affairs office at **(787)265-3862 or (787)832-4040** extensions **3250** and/or **3258** or the "Oficina de Calidad de Vida" at extension 5467.

8g. Ethics: Any academic fraud is subject to the disciplinary sanctions described in Article 14 and 16 of the revised General Student Bylaws of the University of Puerto Rico contained in Certification 018-1997-98 of the Board of Trustees. The professor will follow the norms established in Articles 1-5 of the Bylaws.

8h. Smoking: Smoking is prohibited by law in all areas inside the Chemistry building, except for those designated for smoking.

8i. Due to health and safety reasons, seating and/or lying down on the floor inside and/or outside (hall) the laboratory is prohibited. It is recommended for the students to wait at the main lobby (ground (G) floor) of the Chemistry building until it is time for your laboratory to start.

9. Laboratory/Field Work Policies:

- All reports must be submitted one week after completing the experiment. Reports must be written in English using your best writing skills. Failure to submit a report two weeks after its completion will result in a **10% deduction**. Reports submitted 15 to 30 days beyond deadline, will receive **35%**. Reports submitted after 30 days will not be graded and will receive a score of 0%.
- Each group member must analyze reports that include shared data, independently. Data analysis and written discussion must be unique for each student. Obvious similarities upon group members will be considered cheating and will be severely penalized.
- Experiments cannot be repeated.
- Absences to **three or more** laboratory experiments will automatically result in an **F** in the QUIM-3025 course.
- Pre-laboratory Exercise: Must be handed to the instructor, at the beginning of the lab period, unless instructed otherwise. This will be used to evaluate your preparation and readiness for the experiment. This document must be prepared using a computer and must include a "Reference Section". Mathematical/exercise problems must include the procedure; no credit will be given for result only.
- Lab notebooks will be revised (and signed) by the instructor weekly to evaluate how prepared you come to the lab.



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1. Evaluation/Grade reporting:

| Activity | | Points |
|--------------------|---|-------------|
| 10 | Pre-laboratory write-ups: Answers to study questions | 100 |
| 9 | a. Experiments and Exercises: 4 Accuracy Reports (100 pts. each) [Precision-10%, Conclusions-10%, Accuracy-80%] 3 Full Reports (100 pts. each) 2 Forms Reports: Excel, Cal (100pts. each) b. Multi-Technique Form (15 extra credit pts.) | 900 |
| 1 | Final Laboratory Exam | 200 |
| 1 | Oral Presentation (based on performed experiments) | 100 |
| 1 | Laboratory Notebook (Overall – including data, calculations, results) | 50 |
| 1 | Laboratory Work | 50 |
| 7 | Short Test (10pts) | 70 |
| Grand Total | | 1470 |

Course (Laboratory) Content: (May be subject to changes)

EXPERIMENTS QUIM-3025L

| Experiment / Activity | Legend | Report Format | Carried out as: |
|---|----------|-------------------------------|-----------------|
| 1. Introduction | Introd | N/A | N/A |
| 2. Multi-technique laboratory | MTec* | Bonus - Form | Individual |
| 3. Using the Computer for Data Analysis | Excel | Forms | Individual |
| 4. Introduction to Analytical Technical Writing | TecW | Full | Group (2) |
| 5. Calibration of Volumetric Glassware | Cal* | Forms | Group (2) |
| 6. Preparation of Analytical Solutions I and Analysis of their Concentration by UV Absorbance Data | Soln. I* | Full | Group |
| 7. Preparation of Analytical Solutions II and Analysis of their Concentration by UV Absorbance Data | Soln. II | Full (Short Version) | Group |
| 8. Determination of Ni | Ni* | Accuracy | Group |
| 9. Determination of KHP by Acid-Base Titration | KHP* | Accuracy | Group (2) |
| 10. Complexometric Titration of Magnesium with EDTA | EDTA* | Accuracy | Group (2) |
| 11. Potentiometric Titration of Iron in Mohr's Salt | Fe* | Accuracy | Group (2) |
| 12. Oral Presentation | OP | Power Point | Group (2) |

Pre-laboratory Exercise:

*Experiments with short test. 10 minutes duration and will start at the beginning of the laboratory period. There will be no short test reposition.

**QUIM 3025L LABORATORY SCHEDULE
FIRST SEMESTER ACADEMIC YEAR 2015-2016
(May be subject to changes)**

| | Monday | Tuesday | Wednesday | Thursday | Friday |
|------------------------|---------------------|-----------------------------------|------------------------------|-------------------------------|-----------------------|
| August 10-14 | | | | Classes Start | Introducción |
| 17-21 | Introduction | | Introduction | | Mtec |
| 24-28 | Mtec | | Mtec | Tropical Storm | Tropical Storm |
| August-Sept. 31-4 | Excel | | Excel | | Excel/TecW |
| 7-11 | Holiday | | TecW | | |
| 14-18 | TecW | | Cal | | Cal |
| 21-25 | Cal | Acad. Wednesday Soln I | RUM Anniversary | | Soln I |
| Sept.-October 28-2 | Soln I | | Soln II | | Soln II |
| 5-9 | Soln II | | Ni I | | Ni I |
| 12-16 | Holiday | | Acad. Monday Ni I | | Ni II |
| 19-23 | Ni II | | Ni II | | Ni III/KHP |
| 26-30 | Ni III/KHP | | Ni III/KHP | | EDTA |
| November 2-6 | EDTA | | EDTA | | Fe |
| 9-13 | Fe | | Holiday | Acad. Wednesday Fe | OP |
| 16-20 | OP | | OP | Holiday | Acad. Thursday |
| 23-27 | Acad. Friday | Acad. Thursday | | Holiday | Holiday |
| Nov.-December 30-4 | | Last Day Partial Exam | | Final Exam Lab** | |
| December 7-11 | | Last Day Classes | | | |

**Lab Final Exam: Thursday, December 3, 2015 @ 7:20-9:20 PM