

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

Course N°: QUIM 3451

Title of Course: Organic Chemistry Fundamentals Laboratory

Credits: 0

Open to: Industrial Chemical Processes Technology and Chemical Engineering Transfer students

Contact Hours: 4/weekly

Pre-requisite: none

Textbook: Organic Chemistry Fundamentals Laboratory Manual

Co-requisite: QUIM 3450

Author: Ricardo Infante

Publisher: UPRA

Publication Year: 2011

Other Supplemental Materials:

- Química Orgánica Manual de Laboratorio, Escala Micro, Aponte, M. A.; Rivera, Z. L.; Guntín, M. N. Parte I, Cuarta Edición, Librería Universal, 2004.
- *Macroscale* and Microscale Organic Experiments, Kenneth *Williamson*, 3rd ed. , Houghton Mifflin Co, Boston, MA, 1999
- Introduction to Spectroscopy, Donald L. Pavia, Gary M. Lampman, George S. Kriz, James A. Vyvyan 4 edition- Publisher: Brooks Cole, 2008

Term: Second Semester

Course Coordinator: Dr. Ricardo Infante

Course Description:

Laboratory experiences applying standard techniques used in the synthesis, purification and identification of organic compounds.

Course Objectives:

- Create and maintain a proper laboratory notebook that meets the specifications of a scientific document.
- Use standard organic laboratory techniques of reaction methods, heating and cooling methods, separation methods, extraction, filtration, drying, crystallization, and distillation to conduct organic synthesis.
- Perform and analyze a variety of physical, chemical and spectroscopic tests to determine the identification of unknown chemical substances.

Relation of Course to Program Objectives:

1	2	3	4
x			

Relation of Course to Program Outcomes:

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

Evaluation/Grade Reporting: 2 partial exams (66%), laboratory reports (24%), laboratory notebook (5%), laboratory work (5%)

Topics	Teaching/Learning Strategies Time Distribution (hours)
1.Laboratory safety	Introduction lecture focus to the nature of hazards, reduction of risks and precautionary measures. Basic description of lab facilities. Team work (4)
2.Measurement of physical properties	Explanation of the basic theory and the experimental procedure used to measure physical properties of organic compounds. Team work (8)
3. Crystallization	Explanation of the basic theory and the experimental procedure used to crystallization of solid compounds. Team work (4)
4. Distillation	Explanation of the basic theory and the experimental procedure used to simple and fractional distillations. Team work (4)
5. Solvent extraction	Explanation of the basic theory and the experimental procedure used to solvent extraction. Team work (4)
6. Chromatography	Explanation of the basic theory and the experimental procedure used to column and TL-chromatography. Team work (4)
7. Synthesis of alkyl halides	Explanation of the basic theory and the experimental procedure used to SN1 reactions. Team work (4)
8. Benzonitrile hydrolysis	Explanation of the basic theory and the experimental procedure used to basic hydrolysis of nitriles. Team work (4)
9. Esterification	Explanation of the basic theory and the experimental procedure for Fisher esterification. Team work (4)
10. Saponification	Explanation of the basic theory and the experimental procedure for saponification. Team work (4)
11.Spectroscopy	Spectroscopy problem solving media and technology presentation. Team work (16)
Total	60