



BICOL UNIVERSITY
COLLEGE OF SCIENCE
DEPARTMENT of CHEMISTRY
Legazpi City, Philippines

Course	CHEM 122 Analytical Chemistry 2 2-Unit Lecture	1 st Semester 2020-2021 Friday 4:00-7:00PM
Faculty	Michael V. Montealegre	FB Messenger: Michael Montealegre Email: mvmontealegre@bicol-u.edu.ph
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COURSE GUIDE

Description:

A lecture course with accompanying laboratory course (Chem 122.1) designed to develop knowledge and skills for analytical separations and instrumental methods of analysis. Emphasis is placed on the principles of instrumentation, instrument components, the limitations of measurements, and the selection of appropriate techniques for specific analytical samples and problems. The laboratory provides the actual practice of modern analytical chemistry, focused on acquiring laboratory skills in the utilization of these analytical tools in real analytical problems

Course Outline

1. INTRODUCTION TO SPECTROCHEMICAL METHODS
 - a. Properties of electromagnetic spectrum
 - b. The electromagnetic spectrum
 - c. Absorption of radiation
 - d. Emission of electromagnetic radiation
 - e. The Beer's Law
2. INSTRUMENTS FOR OPTICAL SPECTROMETRY
 - a. Instruments' components
 - b. Optical instrument designs
3. SPECTROCHEMICAL METHODS
 - a. Molecular absorption spectroscopy
 - b. IR Spectroscopy
 - c. Fluorescence Spectroscopy
 - d. Molecular fluorescence spectroscopy
 - e. UV-Vis Spectroscopy
 - f. Atomic absorption spectroscopy
 - g. Atomic emission Spectroscopy
 - h. Applications of spectroscopic methods
4. STANDARDIZATION (Additional Topic)
 - a. Standard Reagents
 - b. Methods of Standardization
5. SEPARATION METHODS
 - a. General Principles, calculations and applications
 - b. Introduction to Chromatographic Separations
 - c. Gas-liquid chromatography
 - d. High-Performance Liquid Chromatography
 - e. Supercritical fluid chromatography and extraction
 - f. Application of separation methods
6. ELECTROANALYTICAL METHODS
 - a. Introduction
 - b. Potentiometry
 - c. Coulometry
 - d. Voltammetry
 - e. Applications
7. OTHER ANALYTICAL TECHNIQUES
 - a. SURFACE ANALYSIS
 - b. NUCLEAR METHODS

COURSE REQUIREMENTS:

1. **Learning Modules.** These are posted on the Google Classroom.





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- 2. Calculator.** All students are required to have their own nonprogrammable calculator. Calculators that are allowed by PRC are listed here <http://www.prc.gov.ph/articles.asp?sid=31&aid=3390>. Laptop/Computer is not a requirement. However, it would be useful in learning to use the spreadsheets applied to analytical chemistry problems.
- 3. Exercises and Assigned Work** are found on the handout and/or posted in the Google Classroom. Please take note of the deadline and they are usually given enough time (at least a week before the deadline).
- 4. Online quiz** through Google form. The form will be posted a week before the deadline. If you will have trouble accessing the net or the form, please send me a message and will provide you a copy through other means (such as a hardcopy).
- 5. Online Exam**

REFERENCES:

In addition to the provided modules, our main textbook is:

Skoog, D.A., West, D.M., Holler, F.J., and Crouch, S.R. (2018) Principles of Instrumental Analysis. 7th ed. Cengage learning Asia Pte Ltd. Singapore.

The Chemistry LibreTexts is like the Wikipedia for Chemistry. My recommended internet reference material is the online free version of David Harvey's Analytical Chemistry found on this site: [https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Book%3A_Analytical_Chemistry_2.1_\(Harvey\)](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Book%3A_Analytical_Chemistry_2.1_(Harvey))

Other references are listed on the syllabus and Google Classroom.

SCHEDULE:

Topic (Activity) / Week	A10	A17	A24	A31	S07	S14	S21	S28	O05	O12	O19	O26	N02	N09	N16	N23	N30	D07	D14
Introduction	■	■																	
Spectro 1			■	■															
Spectro 2				■	■														
Spectro 3					■	■													
Standardization						■	■	■											
Separation Techniques									■	■	■								
GC/HPLC										■	■	■							
Redox											■	■							
Electrochemistry												■	■	■	■				
Surface Analysis																■	■	■	■
Nuclear Techniques																	■	■	E

