NEW LEON AUTONOMOUS UNIVERSITY
MEDICAL SCHOOL
Ba CLINICAL CHEMISTRY

SYNTHETIC PROGRAM

1. Module identification code:	
Name of the institution:	Universidad Autónoma de Nuevo León
Name of the school:	School of Medicine
Name of the degree program:	Clinical Chemistry
Name of the course (learning unit):	Spectroscopic methods
Total number of class hours-theory and practice:	72
Class hours per week:	4
Independent study hours:	18
Course modality:	Presential
Module level:	Eigth semester
Core/elective module:	Elective
Curriculum area:	ACFP-F
UANL credit points:	3
Create date:	27/11/2020
Date of last amendment made:	

Person(s) responsible for the designand amendment of the module	Dr. C. Verónica Mayela Rivas Galindo, Dra. Q. Noemí Waksman Minsky

2. Purpose:

This learning unit, both due to its content and its location in the eighth semester of the degree, constitutes an important link within the mechanism of the elective learning units that integrates the QCB study plan. It is a unit that is related to general chemistry, physical chemistry, basic organic chemistry, organic techniques, organic analysis, and applied instrumental analysis. It is a base for students who dedicate themselves to research in the biomedical area.

This LU applies knowledge about different instrumental techniques, to contribute to developing skills that allow the student to evaluate and apply the use of different spectroscopy methods such as: ultraviolet-visible, infrared, atomic, nuclear magnetic resonance (1D and 2D), as well as mass spectrometry. and spectropolarimetric methods, applied to the analysis of samples of biomedical interest. In this way, contribute to achieving the profile of the graduate in the domain of analysis of molecules of biological interest.

Specific competences of the graduate profile to which this module (learning unit) contributes:

1. To solve problems by applying knowledge of the chemical composition of matter as well as its physicochemical properties to determine analytes in biological, environmental and food matrices.

6. To interpret the results of analyses based on established criteria that allow timely and pertinent decision-making in clinical, toxicological, chemical, food, forensic, and environmental diagnosis.

3. Competences of the graduate profile:

General competences to which this module (learning unit) contributes:

- Instrumental skills:

7. To develop inter, multi and transdisciplinary academic and professional proposals in accordance with the best global practices to promote and consolidate collaborative work.

- Personal and social interaction skills:

10. To intervene in the face of the challenges of contemporary society at the local and global level with a critical attitude and human, academic and professional commitment to contribute to consolidating general well-being and sustainable development.

- Integrative skills:

14. To resolve personal and social conflicts, in accordance with specific techniques in the academic field and in their profession for appropriate decision-making.

4. Comprehensive evaluation of processes and products:

- Daily evidences
- PIA

5. Course integrative product:

Integrative evaluation where the acquisition of knowledge on the foundation, uses and applications of the different spectroscopic methods is demonstrated in oral presentation.

6. References:

Duddeck H., Dietrich W., TóthG..(2000). Elucidación structural por RMN. Barcelona: Editorial Springer.

Field L. D., Li H. L., Magill A. M. (2015). Organic Structures from 2D NMR Spectra. EUA: Editorial Wiley.

Friebolin, Horst (2010). Basic One and Two –dimensional NMR Spectroscopy. EUA. Editorial Wiley

Harald Gunther. (2013) NMR Spectroscopy: Basic Principles, Concepts and Applications in Chemistry, 3rd Edition. Germany: Editorial Wiley-VCH.

Neil E. Jacobsen. (2017). NMR Data Interpretation Explained: Understanding 1D and 2D NMR Spectra of Organic Compounds and Natural Products. EUA: Editorial Wiley.

Nicolaou, K.C. y Montagnon T. (2008). Molecules that changed the world. EUA: Editorial Wiley-VCH.

Pretsch, E. y Buhlman, P. (2009). Structure determination of organic compounds. USA: Editorial Springer.

Shiner, Hermann, Morrill, Fuson, Curtin. (2013). Identificación Sistemática de Compuestos Orgánicos. México: Editorial Limusa-Wiley.

Silverstein, R. M. (2005). Spectrometric identification of organic compounds. EUA: Editorial Wiley.

Wade, L.G. (2012). Química Orgánica. México: Editorial Pearson.

Suggested web sites:

1. Study.com, Analyzing Organic Compounds: Methods & Tools, recuperado el 24 de noviembre de 2020. https://study.com/academy/lesson/analyzing-organic-compounds-methods-tools.html
2. University of Alberta. Interactive Tutorial of Infrared Spectroscopy. Recuperado el 24 de noviembre de 2020 de ChemUAlberta.CA. Website: http://www.chem.ualberta.ca/~orglabtutorials/Interactive%20Tutorials/ir/irspec.html
3. Chemistry Libre text. Empirical rules for absortion wavelengths of conjugated systems. Recuperado 24 de nov de 2020. https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Supplemental_Modules_(Organic_Chemistry)/Spectroscopy/Visible_and_Ultraviolet_Spectroscopy/Empirical_Rules_for_Absorption_Wavelengths_of_Conjugated_Systems

4. University of Alberta. Interactive Tutorial of NMR Spectroscopy. Recuperado el 24 de noviembre de 2020 de ChemUAlberta.CA. Website: http://www.chem.ualberta.ca/~orglabtutorials/Interactive%20Tutorials/hnmr/HNMRmain.html
5. WebSpectra, Recuperado el 24 de noviembre de 2020 de University of California https://webspectra.chem.ucla.edu//
6. Video You Tube. Espectrometría de Masas:Principios Básicos, Recuperado 24 de noviembre 2020. https://www.youtube.com/watch?v=ztArLXr8oUEl
7. Video You Tube, How2: interpret a Mass Spectrum. Recuperado 24 de noviembre 2020 https://www.youtube.com/watch?v=ookUh91aUCQ
8. Espectrometría de masas | Química | Khan Academy en Español. Recuperado 24 de noviembre 2020 https://www.youtube.com/watch?v=azq4gvEIOz8
9. Interactive Spectroscopy. Ejercicios combinados para resolución de problemas. Recuperado el 24 de noviembre de 2020 de University of Calgary CA. http://www.chem.ucalgary.ca/courses/351/WebContent/spectroscopy/spectroscopy.html
10. Organic Structure Elucidation, A workbook of unknowns. Recuperado el 24 de noviembre de 2020 de University of Notre Dame. https://www3.nd.edu/~smithgrp/structure/workbook.html
11. Polarimetría. Recuperado 24 de noviembre 2020 https://silviamartinezhquimicablog.wordpress.com/2018/12/05/polarimetria/