



UNIVERSIDAD AUTÓNOMA DE NUEVO LEÓN
SCHOOL OF MEDICINE
Ba CLINICAL CHEMISTRY



SYNTHETIC PROGRAM.

1. Identification data:	
• Institution	Universidad Autónoma de Nuevo León
• College	School of Medicine
• Education program	Clinical Chemistry
• Learning unit	Physicochemistry
• Total hours of classroom, theory and practice	140
• Frequency in classroom per week	7 hours
• Total extra hours (Outside classroom)	70
• Modality	Face-to-face instruction
• Academic period	Second semester
• Type of learning unit	Core
• Curricular area	ACFB
• UANL Credits	7
• Date of elaboration	11/15/2019
• Date of actualization	01/25/2023
• Responsible (s) for the design and actualization	Dr. Q. Juan Ricardo Lucio Gutiérrez

2.Purpose(s):

The purpose of this LU is to encourage students to develop skills that will help them interpret and predict the physicochemical behavior of substances of biochemical interest. This will allow them, as future graduates, to base the design and selection of biochemical analysis tests.

Regarding general skills, during the development of this LU, the student will be able to use logical and mathematical language to interpret and apply universal physical-chemical theories. Likewise, he/she undertakes to respect the working conditions in different contexts and thus contribute to consolidating the general well-being of himself/herself and his/her colleagues. In addition, he/she adapts to the conditions and regulations to work in harmony both in the classroom and in the laboratory.

During the course of the LU, the student also develops specific skills both in the classroom and in the laboratory, as he or she solves problems by applying knowledge of the chemical composition of matter and its physicochemical properties, which will be useful for the determination of analytes in different matrices. Likewise, by complying with the department's safety regulations, observing the safety data sheets of reagents and the Mexican Official Standards (NOMs), the competence to handle chemical and biological materials is developed following the NOMs and/or international standards that guarantee their correct use and disposal to preserve health and the environment.

The Physicochemistry LU is located in the second semester of the Academic Program of Clinical Chemist, for its development it uses the skills acquired in the General Chemistry LU, applying the knowledge of nomenclature, properties of radiation and matter, as well as the management of solutions. In addition, it makes use of the knowledge acquired in the Advanced Mathematics LU such as algebraic equations, management of logarithmic functions and elaboration of graphs, among others, which it uses in the present LU, for the resolution of problems of thermodynamics, kinetics and spectroscopy. On the other hand, it provides the student with the thermodynamic bases, for the understanding of the equilibrium processes that are taught in the Fundamentals of Analytical Chemistry LU. Likewise, the principles of thermodynamics and kinetics reviewed in Physicochemistry, help to understand the reaction mechanisms that are studied in the Basic Organic Chemistry LU. Also, through the study of the colligative and osmotic properties of solutions and colloids, Physicochemistry underpins many phenomena related to homeostasis in the organism, which are examined in depth in the LU of Medical Physiology.

3. Competence of the graduate profile

- **General skills contributing to this learning unit**

Instrumental skills:

2. To use logical, formal, mathematical, iconic, verbal and non-verbal languages according to their stage of life, to understand, interpret and express ideas, feelings, theories and currents of thought with an ecumenical approach.

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:

15. To achieve the adaptability required by the uncertain social and professional environments of our time to create better living conditions.

- **Specific skills of the graduate profile that contributes to the learning unit**

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.

3. To handle chemical and biological materials following official Mexican and/or international standards that guarantee their correct use and disposal to preserve health and the environment.

4. Factors to consider for evaluating the learning unit

- Course integrative project/product

5. Integrative learning Product:

Written evaluation with theoretical and practical resolution of application problems and evaluation of concepts of thermodynamics, spectroscopy and kinetics.

6. Sources of support and consultation (bibliography, hemerography, electronic sources):

Brown TL. (2014) Chemistry. The Central Science. Mexico: Prentice Hall publishing house.

Christian GD. (2008) Analytical Chemistry. Mexico: Mc Graw Hill publishing house.

Lucio JR. (2020) Manual of Physicochemistry Practices. Mexico: editorial Department of Analytical Chemistry, Faculty of Medicine, UANL.

Skoog DA. (2015) Fundamentals of Analytical Chemistry. Mexico: CENGAGE Learning publishing house.

Abgna , E. (17 May 2014). Partial Pressures and Gas Collection Above a Water Column. Thermodynamics. Retrieved from: <https://youtu.be/I5Hd9fVoW2E>

Anibal , C. (Jun. 8, 2012). Heat Capacity. Retrieved from: <https://youtu.be/2AmZZsLAwwg>

Cienciabit : Science and Technology. (Nov. 15, 2015). How to Collect and Measure Gases. Retrieved from: <https://youtu.be/ozko7fkg4Ko>

Flores, D. (Nov. 6, 2017). UV-Vis Spectrometry – Part 1. Retrieved from: <https://youtu.be/KRNhrRqs2UM>

Foncea , V. (accessed June 2020). Radio Astronomy Handbook, ALMA at school. Chile. Atacama Large Page Millimeter / submillimeter Array . https://almaobservatory.org/wp-content/uploads/2016/11/manual_radioastronomia_web.pdf

Maestro TV SNTE. (Feb. 16, 2016). Have fun learning - Laboratory, Heat capacity S3E26 - SNTE National. <https://youtu.be/ogmuQZIDnvk>