

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):	Applied Analytical Chemistry
Total number of class hours-theory and practice:	160
Class hours per week:	8
Independent study:	50
Course modality:	Face-to-face instruction
Module level:	Fourth semester
Core/elective module:	Core
Curriculum area:	ACFP-F
UANL credit points:	7
Create date:	14/02/2018
Date of last amendment made:	25/01/2024

Person(s) responsible for the design and amendment of the module:	Diseño: Dra. Rocío Castro Ríos, Dra. Marsela Garza Tapia Actualización: Dra. Rocío Castro Ríos, Dra. Marsela Garza Tapia, Dra. Graciela Granados, Dra. Magdalena Escobar Saucedo, QCB Alejandra B. Fraga López, QCB Jahaziel J. Eufacio de la Garza
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2. Purpose:

The Applied Analytical Chemistry learning unit (LU) aims to contribute to the development of skills that allow students to apply the fundamentals of Analytical Chemistry to the selection, development, and validation of analysis methods for compounds of biochemical interest.

Regarding UANL general competences, in this LU students will develop effective communication skills in both oral and written forms by conveying the outcomes of their laboratory work for the development, evaluation, and application of titration, gravimetric, potentiometric, and separation methods. In addition, they strengthen their participation and commitment to their work group, fulfilling the assigned responsibilities and respecting the rules and regulations established for both the theoretical course and the practical work. Likewise, they will develop leadership capabilities through collaborative efforts, including organizing team activities, planning strategies, and fostering cooperation to achieve personal goals and contribute to collective success.

In this LU, students develop specific theoretical and practical skills when carrying out chemical analysis procedures to separate and quantify analytes in different matrices, generating reliable results according to national and international regulations, when handling and arranging chemical compounds following the procedures established in the laboratory, when evaluating the performance of analytical methods following the recommendations of the guidelines of national and international organizations, and when evaluating the results obtained with statistical methods to ensure their reliability.

Applied Analytical Chemistry is a mandatory LU pertaining to the fourth semester of the Bachelor's Degree in Clinical Chemistry, which uses the skills acquired in Fundamentals of Analytical Chemistry LU, applying chemical equilibrium principles to quantitation methods. It uses the knowledge acquired in General Chemistry LU for the formulation of reactions and equations balancing as well as for concentration calculations. In addition, the development and evaluation of analytical methods requires knowledge of descriptive statistics, hypothesis testing, and linear regression, acquired in Biostatistics LU.

Applied Analytical Chemistry LU provides the basic knowledge for analytical methods development and evaluation required for Instrumental Analysis, Clinical Biochemistry, and Food Analysis LUs.

3. Competences of the graduate profile:

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

- *Instrumental skills:*

To master their mother tongue orally and in writing with correctness, relevance, timeliness and ethics, adapting their message to the situation or context, for the transmission of ideas and scientific findings. Competencias personales y de interacción social.

- *Personal and social interaction skills*

To maintain an attitude of commitment and respect towards the diversity of social and cultural practices that reaffirm the principle of integration in the local, national and international context in order to promote environments of peaceful coexistence.

- *Integrative skills::*

To assume leadership roles committed to social and professional needs in order to promote relevant social change.

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

To execute physical, chemical and/or biological procedures in the collection, handling, storage and analysis of samples to contribute to a reliable clinical, toxicological, chemical, food, forensic and environmental diagnosis.

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.

To validate bioanalytical methods under established performance criteria that allow reliability of the results obtained in chemical-biological samples.

To guarantee the reliability of the analytical results obtained by applying quality control guidelines as established by laboratory policies for correct decision-making.

4. Factors to consider for evaluating the learning unit

- Evidences.
- Activities and exercises portfolio.
- Integrative written assessment.
- Accredited activities.
- Course integrative project/product.

5. Course integrative project/product:

Solving problems related to titrations, potentiometry, gravimetry, separations, and validation of analytical methods: 12.5% (Criteria for evaluation of the Integrated Learning Product, annex 1)

6. References::

Brown, T. L. y Lemay E. H. (2013). *Química la Ciencia Central*. México: editorial Pearson.

Buttler, J. (1998) *Ionic Equilibrium, Solubility and pH calculations*. EUA: editorial Wiley Interscience.

Christian, G. (2009) *Química Analítica*. México: editorial McGraw Hill Interamericana.

Harris, D.C. (2007) *Análisis Químico Cuantitativo*. España: editorial Reverté

Sánchez-Batanero, P., Gómez del Río, M. I. (2002) *Química Analítica General Volumen I, Equilibrios en disolución y métodos analíticos*. España: editorial Síntesis.

Silva, M. y Barbosa, J. (2002) *Equilibrios iónicos y sus aplicaciones analíticas*. España: editorial Síntesis.

Journal of the Mexican Chemical Society, Sociedad Mexicana de Química, <https://www.jmcs.org.mx/index.php/jmcs>

Analytical Chemistry, American Chemical Society, <https://pubs.acs.org/journal/ancham>

AnalyticaChimicaActa, Elsevier, <https://www.journals.elsevier.com/analytica-chimica-acta>

Talanta, Elsevier, <https://www.journals.elsevier.com/talanta>

Amigos de la Química, Youtube. <https://www.youtube.com/channel/UCTiu0apxEtCGpuLYel-owkg>

LabRoots (2018, octubre 30). Keynote Presentation: Solid Phase Microextraction: New Developments in Bioanalysis [Archivo de video].

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