



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	Applied instrumental analysis
• Total hours of classroom, theory and practice	80
• Frequency in classroom per week	4 hours
• Total extra hours (Outside classroom)	10
• Modality	Schooled
• Academic period	Sixth, seventh, eighth and ninth semester
• Type of learning unit	Elective
• Curricular area	ACFP-F
• UANL Credits	3
• Date of elaboration	20/09/2017
• Date of actualization	17/01/2023
• Responsible (s) for the design and actualization	Dr. C. Ricardo Salazar Aranda

2.Purpose(s):

The purpose of this learning unit is to contribute to achieving the graduate profile by developing the necessary skills to select, design, validate and apply the appropriate methodology to perform a chemical analysis using instrumental methods, as well as to interpret and discuss the results.

During the learning unit, students develop some general skills, as they are able to use critical and proactive thinking when selecting and applying various instrumental methods when carrying out teamwork, maintain an attitude of commitment and respect towards the opinions and way of working of their peers; they also propose methods that use cutting-edge instrumental techniques and generate less toxic waste, to contribute to preserving the environment.

The student also develops specific skills by selecting instrumental methods and applying them to biological and food matrices to determine analytes of clinical, toxicological and food interest. The student handles materials, reagents and biological samples following the Mexican Official Standards, taking care of his/her health and preserving the environment. The student determines the analytical quality parameters of each method used to guarantee the reliability of the results. The student interprets the results and compares them with reference values in international Standards and Guides in order to make value judgments that allow him/her to make timely and pertinent decisions.

The Applied Instrumental Analysis learning unit can be taken from the sixth semester of the Clinical Chemistry and uses the skills acquired in the Fundamentals of Analytical Chemistry and Applied Analytical Chemistry learning units, applying knowledge of solution preparation and analytical validation; it also makes use of knowledge acquired in the Instrumental Analysis learning units by justifying analytical methods and using instrumental equipment.

Likewise, the UA of Applied Instrumental Analysis encourages students to analyze, interpret and discuss results based on scientific articles, standards and regulatory guides, both national and international, which provide the basis for the learning units of Research Seminar, Administration and Quality Assurance and Food Analysis.

3. Competence of the graduate profile

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

Instrumental skills:

5. To use logical, critical, creative and proactive thinking to analyze natural and social phenomena that allow them to make relevant decisions in their sphere of influence with social responsibility.

Personal and social interaction skills:

9. 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:

12. To make innovative proposals based on a holistic understanding of reality to help overcome the challenges of the interdependent global environment.

- **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.
2. 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.
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. To validate bioanalytical methods under established performance criteria that allow reliability of the results obtained in chemical-biological samples
5. To incorporate new analytical methodology that contributes to the functional, economic and/or environmental improvement of laboratory processes to respond to needs in health areas.
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.
7. 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

- Oral and written presentation of topics assigned by the professor.
- Evidences.
- Accredited activities.
- Course integrative project/product

5. Course integrative project/product:

Presentation of comparative tables with the results of each determination, obtained with the different levels of variation of the most critical step.

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

Skoog D.A., Holler F. J., Crouch S. (2018) Principles of Instrumental Analysis. (7th edition) Spain: Ed. Cengage Learning.

Skoog, D. A. Holler F. J., Crouch S. (2009). Principles of Instrumental Analysis. (6th edition)
<https://www.academia.edu>.

https://www.academia.edu/37326567/Principios_de_an%C3%A1lisis_instrumental_6ta_Edici%C3%B3n_Douglas_A._Skoog_LIBROSVIRTUAL

Benson, S.W. (2002) Chemical calculations. An introduction to the use of mathematics in chemistry. Mexico: Limusa publishing house.

Dr. C. Blanca Alicia Alanís Garza, Dr. Norma Cecilia Cavazos Rocha, Dr. Ricardo Salazar Aranda, Q.C.B. Olga Catalina Rodríguez Martínez, Dr.C. Alma Leticia Saucedo Yañez, Dr. C. David Paniagua Vega. (2020) Manual of procedures for the laboratory of Instrumental Analysis. (7th edition) Mexico: Ed. UANL

Christian, G. (2009) Analytical Chemistry. Mexico: McGraw Hill Interamericana publishing house.

Harris D. Quantitative Chemical Analysis. Ed. Reverté S.A. 3rd Edition. 2007. Chapters 0, 1, 5 and 29.

Pecsok, R.L. and Shields, L.D. (1997) Modern Methods of Chemical Analysis. Mexico: Limusa Publishing House.

Rouessac, F. and Rouessac, A. (2003). Modern Instrumental Methods and Techniques. Theory and Solved Exercises. Chemical Analysis. Mexico: Mc Graw Hill/Interamericana publishing house.

Rubinson, K. and Rubinson J. (2001). Instrumental Analysis. Spain: Pearson Education S.A.

Sierra, I., Perez, D., Morante, S., Perez, Y., Ballesteros, R. and Sanchez, A. Instrumental Analysis Practices. (2008). Spain: Dykinson S. L publishing house.

<https://www.youtube.com/channel/UCvvnvJtnG9zsko5VzY7T6BDg>