

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):	Biochemistry
Total number of class hours-theory and practice:	140
Class hours per week:	7
Independent study:	40
Course modality:	Face-to-face instruction
Module level:	Fourth semester
Core/elective module:	Core
Curriculum area:	ACFB
UANL credit points:	6
Creation date:	August 28 th , 2017
Date of last amendment made:	January 26 th , 2023
Person(s) responsible for the design and amendment of the module:	Design and amendment: M.Ed. Blanca Esthela Alemán García Amendment: D.Sc. Aurora de Jesús Garza Juárez

2. Purpose:

The learning unit (LU) of Biochemistry aims to foster in the student the development of professional competencies that allow them to interpret the chemical properties of biomolecules, through knowledge of their structure, function, and metabolism. This will enable the future graduate to participate in solving health problems, as well as to support the design, selection, and interpretation of biochemical analysis tests. This LU is in the fourth semester of the Clinical Biologist Chemist educational program. For its development, it uses the competencies acquired in previous LUs such as Medical Physiology to analyze the functioning of apparatuses and systems of living beings, and Basic Organic Chemistry, applying knowledge of the structure and properties of the main organic compounds that will be useful for understanding the chemical composition and metabolism of the main biomolecules. Among the LUs in more advanced semesters, there is a relationship with Molecular Biology, providing the student with the fundamental biochemical bases for the study and analysis of the main macromolecules of life and the interactions that occur between them. Furthermore, Biochemistry, through the study of the structure, function, and metabolism of the main biomolecules, underlies the biochemical tests used as part of clinical diagnosis, which are studied in depth in the Clinical Biochemistry Learning Unit, as well as in Basic Immunology. This LU collaborates in promoting general competencies by fostering in the student logical, critical, and proactive thinking to understand the necessary fundamentals that allow them to integrate the metabolism and regulation of the main biomolecules that constitute living beings, as well as their impact on the functioning of the organism. Also, during this LU, spaces for discussion about the challenges of our society are favored, generating interventions with a critical attitude, human and professional commitment when solving different technical situations that arise in the work area. It contributes to consolidating the general well-being of oneself and one's colleagues, respecting the working conditions in the classroom and in the laboratory when working and executing techniques according to established criteria. During this LU, the student also develops specific competencies as they solve problems by applying knowledge of the chemical composition of matter in the metabolic processes that take place in the organism. Likewise, they develop competencies for the execution of chemical and/or biological procedures in the analysis of samples that contribute to making a clinical diagnosis.

3. Competences of the graduate profile

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

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:

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.

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.

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.

4. Factors to consider for evaluating the learning unit:

- Evidences.
- Written theoretical partial evaluation
- Reports.
- Weighted activities
- Course integrative project/product

5. Course integrative project/product:

Comprehensive resolution of basic concepts and clinical cases where the student applies the interrelation of key biomolecules, water properties, the metabolic role of vitamins, and the interrelationship of amino acid, protein, carbohydrate, and lipid metabolism in different physiological situations.

6.Sources for Support and Reference:

- Baynes, Dominickz. *Medical Biochemistry*. (2015) 4th ed. Mexico: Elsevier (2015)
- Textbook: Emine E. Abali, Dr. Susan M. Viselli; Susan D. Cline; David S. Franklin. (8th edition, 2021)
- *Biochemistry*. Mexico: Lippincott Williams & Wilkins
- Feduchi, Romero, Yañez, Blasco, and García-Hoz. 2nd ed. (2015). Mexico: Editorial Panamericana
- Harper (2014). *Illustrated Biochemistry*. Mexico: McGraw Hill Education
- <http://bq.facmed.unam.mx/revista-de-educacion-bioquimica.html>
- *International Federation for Clinical Chemistry and Laboratory Medicine*. Retrieved from <http://www.ifcc.org/>
- *Biochemistry Laboratory Manual*. Updated edition. Edited by the Biochemistry Department
- *Journal of Biochemical Education* (2015). Retrieved from [http://www.facmed.unam.mx/publicaciones/ampb/numeros/2015/02/REB34\(2\)junio2015.pdf](http://www.facmed.unam.mx/publicaciones/ampb/numeros/2015/02/REB34(2)junio2015.pdf)
- *Spanish Society of Biochemistry and Molecular Biology* (September 2016). *The Challenge of Future Nutrition*: Spanish Society of Biochemistry and Molecular Biology No. 189, September 2016 ISSN:1696-473X. Retrieved from <http://www.sebbm.es/revista/pdf.php?id=16&isrevista=1>
- *The Journal of Biological Chemistry*. F1000. Retrieved from <http://www.jbc.org/browserellinks>

Open Access Resources:

- Enzymes
RCSB Protein Data Bank. (2017, April 20). *How Enzymes Work* [Video file]. Retrieved from <https://youtu.be/yk14dOOvwMk>
- Glycolysis
VCell.ndsu.edu. (2013, February 12). *Glycolysis: An Overview* [Video file]. Retrieved from <https://youtu.be/8Kn6BVGqKd8>
- LDL and HDL Cholesterol | Good and Bad Cholesterol
Nucleushealth [Nucleus Medical Media]. (2015, April 17). [Video file]. Retrieved from <https://youtu.be/0U7YHRW5dyc>
- Fats, Biochemistry
Nucleushealth [Nucleus Medical Media]. (2015, April 17). *LDL and HDL* [Video file]. Retrieved from <https://youtu.be/BVxeeiR7JB0>
- Lipid Overview | Macromolecules | Biology
[Video file]. Retrieved from <https://youtu.be/Ezp8F7XJHWE>
- Citric Acid Cycle
VCell.ndsu.edu. (2014, March 26). *The Citric Acid Cycle: The Reactions* [Video file]. Retrieved from <https://youtu.be/cXVleFtzeE>
VCell.ndsu.edu. (2013, November 13). *The Citric Acid Cycle: An Overview* [Video file]. Retrieved from <https://youtu.be/F6vQKrRjQcQ>

- Metabolic States

Universidad de los Andes. (2013, August 23). *Nutritional Metabolic States* [Video file].

