UANL
UNIVERSIDAD AUTÓNOMA DE NUEVO LEÓN

FACULTAD DE MEDICINA

MODULE DESCRIPTION (ANALYTIC PROGRAM).

1. Module Information Code:	
• Name of the institution and school	Universidad Autónoma de Nuevo León, School of Medicine
• Name of the course (learning unit)	Pharmacology and Toxicology
• Total number of class hours- theory and/or practice	120 hours
• Total number of hours of independent study	90 hours
• Course modality (face-to-face, online, hybrid)	Face-to-face
• Type of academic term (Semester or four-month)	6th semester
• Type of course (required/elective)	Required
• Curriculum area (ACFGU, ACFB, ACFP-F, ACFP-I)	ACFP-F
• UANL credit points (whole numbers)	7
• Create date (dd/mm/yy)	October 13, 2014
• Date of last amendment made (dd/mm/yy)	January 25, 2021
• Person(s) responsible for the design and amendment of the module:	Dr. med. Lourdes Garza Ocañas Dr. C. María Teresa Zanatta Calderón Dr. C. Eduardo Javier Tamez de la O Dr. C. Christian Tadeo Badillo Castañeda Dr. C. Jesús Triana Verástegui Dr. C. Víctor Armando Tamez Rodríguez Dr. C. Pedro Lennon Sáenz Chávez Dr. C. Sandra Lucía Montoya Eguía Dr. med. Juan Antonio Cuéllar López

2. Introduction

The learning unit of Pharmacology and Toxicology consists of 10 stages, the first one includes the introduction to the basic concepts of Pharmacology, such as medicine, drug, dose, pharmacokinetics, pharmacodynamics among others. After learning the basic concepts, in stage 2 the student will identify the drugs that act on the nervous system, including antidepressants, anesthetics and drugs with activity in the autonomic nervous system, among others. Stage 3 includes the groups of analgesic and anti-inflammatory drugs. Stage 4 will recognize drugs used in the therapy of cardiovascular diseases such as hypertension, angina, arrhythmias, among others. Drugs with activity in the endocrine system will be reviewed during stage 5, while stage 6 includes iron salts, vitamins and drugs used in the treatment of nutritional deficiencies. Stage 7, drugs with activity in the respiratory system, includes those used as antitussives, mucolytics, bronchodilators, among others. Stage 8 includes drugs used in the therapy of gastrointestinal diseases such as laxatives, antidiarrheals and antiemetics among others. Chemotherapy against infections (antibiotics, antivirals, etc.) is reviewed in stage 9 and finally stage 10 includes issues related to Toxicology (poisoning by pesticides, alcohols, heavy metals,) and its treatment. Finally, the course ends with the elaboration of the PIA that consists of the resolution of clinical cases using pharmacological therapy, contemplating its indications and its doses.

3. Purpose:

The teaching of Pharmacology has a main mission: to train professionals with knowledge, skills and attitudes that will allow them, at the end of their degree and throughout their professional lives, an optimal use of medicines in accordance with health needs.

The purpose of this course is to teach the methodological foundations of Pharmacology and Toxicology, to provide students of the degree in Medicine, the scientific knowledge that allows them to select the most effective and safe drugs and therapeutic strategies best adapted to each patient. The learning unit teaches that the objective of pharmacological therapy is to improve the health status of patients, and that this depends on the interrelationship between drugs and patients, in which the therapeutic response, possible side effects and inter-individual variability must be evaluated.

It provides the pharmacokinetic and pharmacodynamic bases of the drugs used in medical therapy which allows a comparison between drugs that have similar indications and to study, foresee and treat the possible adverse effects that occur considering the characteristics of the patient and his or her health status in order to provide optimal treatment, with the least adverse

effects. It also allows the student to analyze the signs and symptoms to diagnose the most frequent intoxications with drugs and/or toxic substances and to select the appropriate treatment; contributing to the resolution of the main health problems of the first level of care.

This Learning Unit is related to Physiology, Biochemistry and Molecular Biology, Pathology and all the Learning Units of the Clinical Area.

Through the implementation of a competency-based model, focused on the acquisition of meaningful learning through problem solving, the development of autonomous learning is encouraged. Problem solving as a learning strategy allows data analysis for decision making with critical and responsible thinking to determine appropriate medical therapy and health care options.

4. Competences of the graduate profile

a. General competences contributing to this learning unit.

Instrumental skills:

1. Apply autonomous learning strategies in the different levels and fields of knowledge that allow them make appropriate and relevant decisions in the personal, academic and professional fields.

2. Use the logical, formal, mathematical, iconic, verbal and non-verbal languages according to their stage of life, in order to understand, interpret and express ideas, feelings, theories and streams of thinking with an ecumenical focus.

Personal and social interaction skills

9. 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 with the purpose of promoting environments of peaceful coexistence.

10. Intervene in front of the challenges of contemporary society at the local and global level with a critical attitude and human, academic and professional commitment to help consolidate the general wellness and sustainable development.

11. Practice the values promoted by the UANL: truth, equality, honesty, liberty, solidarity, respect for life and anyone's, peace,

respect for nature, integrity, ethics behavior and justice, within their personal and professional environment in order to make a sustainable society.

Integrative skills

13. Take the lead according to social and professional needs to promote relevant social change.

14. Resolve personal and social conflicts in accordance with specific techniques in the academic field and their profession for the proper decision making.

b. Specific competences of the graduate profile that contributes to the learning unit

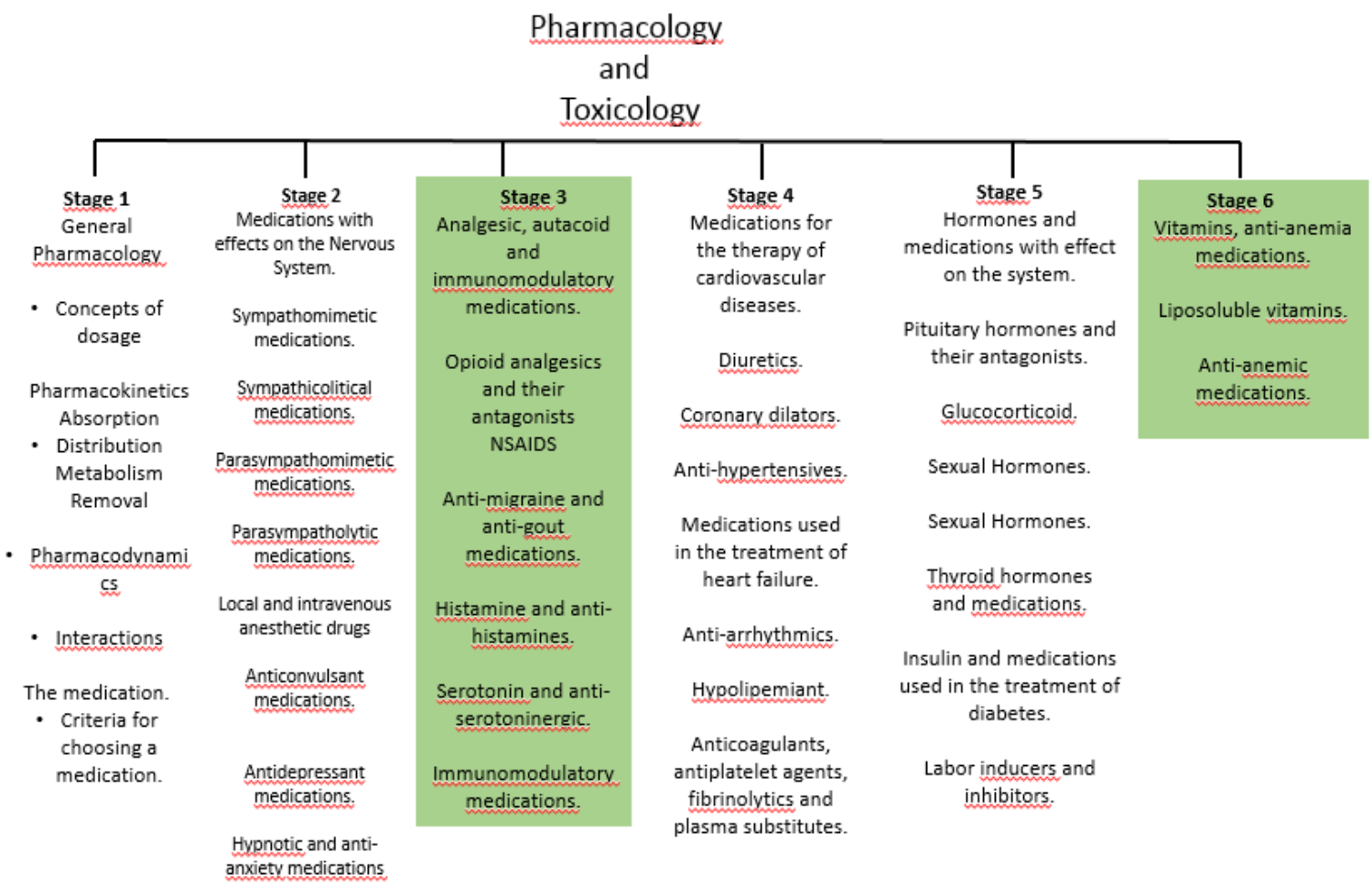
Professional Clinical Practice

2.- Solves clinical problems through deductive reasoning, interpretation of findings and definition of their nature with the aim of making decisions and determine action principles of the medical practice to follow in a responsible way, impacting individual and collective health.

4.- Manages properly patients with the most frequent diseases from a biopsychosocial perspective, through the application of knowledge, technical procedures and basic diagnostic, based on clinical guides and attention protocols in order to solve the main health problems from the Primary Health Care level from individuals and the community.

6.- Manages human resources, diagnostic interventions, therapeutic modalities, and options on health care according to national standards, promoting a quality culture in attention and guaranteeing patients' security.

5. Course roadmap:



Pharmacology and Toxicology

Stage 7

Medications with action on the respiratory system.

Antitussives, mucolytics and expectorants.

Medications used in the treatment of asthma.

Stage 8

Medications with action on the digestive system.

Antiacids.

Laxatives, antidiarrheals and prokinetics.

Anti-spasmodic and antiemetic.

Stage 9

Chemotherapy of infectious diseases.

Generalities of chemotherapy and penicillins.

Cephalosporins and other beta-lactam antibiotics.

Sulphonamides and Quinolones.

Tetracyclines, Aminoglycosides and Chloramphenicol.

Macrolides, Lincosanides and other antibiotics.

Antifungal medications.

Medications for the treatment of tuberculosis and leprosy

Antiviral medications.

Antiamerican and anthelmintic medications.

Anti-malarial medications

Stage 10

Toxicología

General aspects of Toxicology and general treatment of intoxications.

Lead poisoning.

Mercury poisoning.

Arsenic poisoning.

Asphyxiant gas poisoning.

Caustic poisoning.

Organic solvent poisoning.

Insecticide poisoning.

Intoxication by methyl, ethyl and ethylene glycol alcohol

Salicylate poisoning

Paracetamol poisoning.

Antidepressant poisoning.

Plant based toxins.

Toxins of animal origin.

Medications in pregnancy.

Phase 1: General Pharmacology

Component(s) of the competence:

Analyzes the concept of Dose and the processes related to the pharmacokinetics and pharmacodynamics of the medications as well as the adverse effects and pharmacological interactions to support the indications, contraindications of the different groups of medications in medical therapeutics.

Evidence of student learning	Performance Criteria	Learning activities	Content	Resources
Evidence 1: Resolution and evaluation (in the classroom) of a clinical case related to the pharmacokinetics and pharmacodynamics of medications as well as adverse effects and pharmacological interactions.	• The resolution of the clinical case will be in class, individual and following the criteria established by the facilitator. • The review of concepts will be individual, in class, on the date and at the time established and according to the criteria established by the professor.	• The student exposes class in the classroom. • The professor guides the discussion and helps during the presentation. • The concepts addressed and their expression in clinical pharmacokinetic curves are discussed. • Students analyze pharmacokinetic parameters and their behavior in a clinical case.	**Conceptual** • Drug • Poison • Dose • Pharmacokinetics • Absorption • Distribution • Metabolism • Removal • Pharmacodynamic • Receiver • Agonist • Antagonist • Interaction • Adverse reaction	Classroom Online Platform Computers and Pharmacokinetic Software Stella. Library Textbooks

	• It will be delivered on a sheet of paper, handwritten and printed.	• The different processes of pharmacokinetics are discussed. • Students present examples of the different mechanisms of action. • The professor makes final comments on the presentation and clarifies doubts and omissions. • The professor requests the study of the topic prior to the session.	**Procedural** • Mention the routes of administration of medicines **Attitudinal** • Rigor in the use of drugs • Objectivity in dosage • Discipline towards academic work • Consistency in academic work	

Phase 2. Medications with action on the nervous system

Component(s) of the competence:

Classifies medications with action on the nervous system and the diseases and medical conditions in which they are used, considering their pharmacokinetics, pharmacodynamics, therapeutic effects, indications, contraindications, adverse reactions and interactions to support medical therapy.

Evidence of student learning	Performace Criteria	Learning activities	Content	Resources

Evidence 2: Resolution and evaluation (in the classroom) of a clinical case involving medications with action on the nervous system. Practice	• The resolution of the clinical case will be in class, individual and following the criteria established by the facilitator. • The review of concepts will be individual, in class, on the date and at the time established and according to the criteria established by the professor. • It will be delivered on a sheet of paper, handwritten and printed.	• The student exposes class in the classroom. • The professor guides the discussion and helps during the presentation. • The concepts treated and their expression in clinical pharmacokinetic curves are discussed. • Students analyze pharmacokinetic parameters and their behavior in a clinical case. • Students present examples of the different mechanisms of action. • The professor makes final comments on the presentation and clarifies doubts and omissions.	**Conceptual** • Sympathomimetics • Simpaticolitics • Parasympathomimetic • Parasympathictics • Local and intravenous anesthetics • Anticonvulsants • Antidepressants • Sedatives, anxiolytics and hypnotics **Procedural** • Classify the groups of medicines • Explain the pharmacodynamics (mechanism of action) of drugs • Explain pharmacokinetics (absorption, distribution, metabolism and elimination)	Classroom Online Platform Computers and Pharmacokinetic Software Stella. Library Textbooks

		• The professor requests the study of the topic prior to the session.	• Describe your indications and contraindications • Apply the dosage of the medicine • Mention the routes of administration and their doses • List the most important interactions and adverse reactions **Attitudinal** • Rigor in the use of drugs • Objectivity in dosage • Discipline towards academic work • Consistency in academic work	

Stage 3. Analgesic, autacoid and immunomodulatory medications

Component(s) of the competence:

Analyze analgesics (NSAIDs and Opioids), anti-gout and anti-migraine medications, autacoids (histamine, antihistamines, serotonin and anti-serotonin) and immunomodulatory medications according to their classification, pharmacokinetics, pharmacodynamics, pharmacological effects, adverse effects and higher risk interdependencies to support their indications, contraindications and routes of administration.				
Evidence of student learning	**Performace Criteria**	**Learning activities**	**Content**	**Resources**
Evidence 3: Resolution and evaluation (in the classroom) of a clinical case related to analgesic, autacoid and immunomodulatory medications.	• The resolution of the clinical case will be in class, individual and following the criteria established by the facilitator. • The review of concepts will be individual, in class, on the date and at the time established and according to the criteria established by the professor. • It will be delivered on a sheet of paper,	• The student exposes class in the classroom. • The professor guides the discussion and helps during the presentation. • The concepts treated and their expression in clinical pharmacokinetic curves are discussed. • Students analyze pharmacokinetic parameters and their behavior in a clinical case. • Students present examples of the different mechanisms of action.	**Conceptual** • NSAIDs • Opioids • Antigotosos • Anti-migraine • Histamine and antihistamines • Serotonin and antagonists • Immunomodulators **Procedural** • Classify the groups of medicines • Explain the pharmacodynamics (mechanism of action) of drugs	Classroom Online Platform Computers and Pharmacokinetic Software Stella. Library Textbooks

	handwritten and printed.	• The professor makes final comments on the presentation and clarifies doubts and omissions. • The professor requests the study of the topic prior to the session.	• Explain pharmacokinetics (absorption, distribution, metabolism and elimination) • Describe your indications and contraindications • Apply the dosage of the medicine • Mention the routes of administration and their doses • List the most important interactions and adverse reactions **Attitudinal** • Rigor in the use of drugs • Objectivity in dosage • Discipline towards academic work • Consistency in academic work	

Stage 4. Medications used in the treatment of cardiovascular disease

Component(s) of competence:

Classifies drugs with action in the cardiovascular system: diuretics, coronary dilators, antihypertensives, antiarrhythmics, hypolipemics, treatment of heart failure, anticoagulants, fibrinolytics and plasma substitutes, considering their pharmacokinetics, pharmacodynamics, therapeutic effects, indications, contraindications, adverse reactions and interactions to support medical therapy of cardiovascular diseases and disorders.

Evidence of student learning	Performance Criteria	Learning activities	Content	Resources
Evidence 4: Resolution and evaluation (in the classroom) of a clinical case involving medications used in the treatment of cardiovascular diseases.	• The resolution of the clinical case will be in class, individual and following the criteria established by the facilitator. • The review of concepts will be individual, in class, on the date and at the time established and according to the criteria established by the professor.	• The student exposes class in the classroom. • The professor guides the discussion and helps during the presentation. • The concepts treated and their expression in clinical pharmacokinetic curves are discussed. • Students analyze pharmacokinetic	**Conceptual** • Diuretics • Coronary Dilators • Treatment of high blood pressure • Antiarrhythmics • Hypolipemics • Heart Failure Treatment • Anticoagulants • Fibrinolytics • Plasma substitutes **Procedural** • Classify the groups of medicines	Classroom Online Platform Computers and Pharmacokinetic Software Stella. Library Textbooks

	• It will be delivered on a sheet of paper, handwritten and printed.	parameters and their behavior in a clinical case. • Students present examples of the different mechanisms of action. • The professor makes final comments on the presentation and clarifies doubts and omissions. • The professor requests the study of the topic prior to the session.	• Explain the pharmacodynamics (mechanism of action) of drugs • Explain pharmacokinetics (absorption, distribution, metabolism and elimination) • Describe your indications and contraindications • Apply the dosage of the medicine • Mention the routes of administration and their doses • List the most important interactions and adverse reactions **Attitudinal** • Rigor in the use of drugs • Objectivity in dosage	

			• Discipline towards academic work • Consistency in academic work	

Stage 5. Hormones and medications with action on the endocrine system

Component(s) of competence:

Classifies medications used in endocrine disorders considering their pharmacokinetics, pharmacodynamics, therapeutic effects, indications, contraindications, adverse reactions and interactions to support medical therapy.

Evidence of student learning	Performance Criteria	Learning activities	Content	Resources
Evidence 5: Resolution and evaluation (in the classroom) of a clinical case involving hormones and medications with action on the endocrine system.	• The resolution of the clinical case will be in class, individual and following the criteria established by the facilitator. • The review of concepts will be individual, in class, on the date and at the time established and	• The student exposes class in the classroom. • The professor guides the discussion and helps during the presentation. • The concepts treated and their expression in clinical pharmacokinetic curves are discussed.	**Conceptual** • Pituitary hormones • Glucocorticoids • Androgens and antagonists • Estrogens and antagonists • Progestagens and antagonists • Thyroid hormone, agonists and antagonists	Classroom Online Platform Computers and Pharmacokinetic Software Stella. Library Textbooks

	according to the criteria established by the professor. • It will be delivered on a sheet of paper, handwritten and printed.	• Students analyze pharmacokinetic parameters and their behavior in a clinical case. • Students present examples of the different mechanisms of action. • The professor makes final comments on the presentation and clarifies doubts and omissions. • The professor requests the study of the topic prior to the session.	• Insulin and its analogues • Pharmacological treatment of diabetes mellitus • Oxytocics and tocolytics **Procedural** • Classify the groups of medicines • Explain the pharmacodynamics (mechanism of action) of drugs • Explain pharmacokinetics (absorption, distribution, metabolism and elimination) • Describe your indications and contraindications • Apply the dosage of the medicine	

			• Mention the routes of administration and their doses • List the most important interactions and adverse reactions **Attitudinal** • Rigor in the use of drugs • Objectivity in dosage • Discipline towards academic work • Consistency in academic work	

Stage 6. Medications used in the treatment of anemia and nutritional deficiencies

Component(s) of the competence:

Classifies medications used in anemia and nutritional diseases considering their pharmacokinetics, pharmacodynamics, therapeutic effects, indications, contraindications, adverse reactions and interactions to support medical therapy.

Evidence of student learning	Performance Criteria	Learning activities	Content	Resources
Evidence 6: Resolution and evaluation (in the	• The resolution of the clinical case will be in	• The student exposes class in the classroom.	**Conceptual** • Oral Iron Salts	Classroom Online Platform

classroom) of a clinical case involving medications used in the treatment of anemia and nutritional deficiencies.	class, individual and following the criteria established by the facilitator. • The review of concepts will be individual, in class, on the date and at the time established and according to the criteria established by the professor. • It will be delivered on a sheet of paper, handwritten and printed.	• The professor guides the discussion and helps during the presentation. • The concepts treated and their expression in clinical pharmacokinetic curves are discussed. • Students analyze pharmacokinetic parameters and their behavior in a clinical case. • Students present examples of the different mechanisms of action. • The professor makes final comments on the presentation and clarifies doubts and omissions.	• Parenteral Iron Salts • Erythropoietin and its analogues • Fat-soluble vitamins • Water-soluble vitamins **Procedural** • Classify the groups of medicines • Explain the pharmacodynamics (mechanism of action) of drugs • Explain pharmacokinetics (absorption, distribution, metabolism and elimination) • Describe your indications and contraindications • Apply the dosage of the medicine	Computers and Pharmacokinetic Software Stella. Library Textbooks

		• The professor requests the study of the topic prior to the session.	• Mention the routes of administration and their doses • List the most important interactions and adverse reactions **Attitudinal** • Rigor in the use of drugs • Objectivity in dosage • Discipline towards academic work • Consistency in academic work	

Stage 7. Medications with action on the respiratory system

Component(s) of competence:

Apply the medications used in the treatment of diseases of the respiratory system considering their pharmacokinetics, pharmacodynamics, therapeutic effects, indications, contraindications, adverse reactions and interactions to support medical therapy.

Evidence of student learning	Performance Criteria	Learning activities	Content	Resources
Evidence 7: Resolution and evaluation (in the	• The resolution of the clinical case will be in	• The student exposes class in the classroom.	**Conceptual** • Antitussives	Classroom Online Platform

classroom) of a clinical case related to medications with action on the respiratory system.	class, individual and following the criteria established by the facilitator. • The review of concepts will be individual, in class, on the date and at the time established and according to the criteria established by the professor. • It will be delivered on a sheet of paper, handwritten and printed.	• The professor guides the discussion and helps during the presentation. • The concepts treated and their expression in clinical pharmacokinetic curves are discussed. • Students analyze pharmacokinetic parameters and their • behavior in a clinical case. • Students present examples of the different mechanisms of action. • The professor makes final comments on the presentation and clarifies doubts and omissions.	• Mucolytics and expectorants • Beta Adrenergic Agonists • Anticholinergic Methylxanthines • Inhaled Glucocorticoids • Leukotrienes **Procedural** • Classify the groups of medicines • Explain the pharmacodynamics (mechanism of action) of drugs • Explain pharmacokinetics (absorption, distribution, metabolism and elimination) • Describe your indications and contraindications	Computers and Pharmacokinetic Software Stella. Library Textbooks

		• The professor requests the study of the topic prior to the session.	• Apply the dosage of the medicine • Mention the routes of administration and their doses • List the most important interactions and adverse reactions **Attitudinal** • Rigor in the use of drugs • Objectivity in dosage • Discipline towards academic work • Consistency in academic work	

Stage 8. Medications with action on the digestive system

Component(s) of the competence:

Describe the most common hydrogen pump inhibitor, antacid and cytoprotective medications used in the treatment of gastrointestinal diseases, including their pharmacokinetics, pharmacodynamics, pharmacological effects, adverse effects and higher risk interdependencies to support their indications, contraindications and routes of administration.

Evidence of student learning	Performance Criteria	Learning activities	Content	Resources

Evidence 8: Resolution and evaluation (in the classroom) of a clinical case related to medications with action on the digestive system.	• The resolution of the clinical case will be in class, individual and following the criteria established by the facilitator. • The review of concepts will be individual, in class, on the date and at the time established and according to the criteria established by the professor. • It will be delivered on a sheet of paper, handwritten and printed.	• The student exposes class in the classroom. • The professor guides the discussion and helps during the presentation. • The concepts treated and their expression in clinical pharmacokinetic curves are discussed. • Students analyze pharmacokinetic parameters and their behavior in a clinical case. • Students present examples of the different mechanisms of action. • The professor makes final comments on the presentation and clarifies doubts and omissions.	**Conceptual** • Neutralizing antacids • Proton Pump Inhibitors • Antihistamines AntiH2 • Antiemetics • Prokinetics • Antispasmodic • Laxatives • Anti-diarrheal **Procedural** • Classify the groups of medicines • Explain the pharmacodynamics (mechanism of action) of drugs • Explain pharmacokinetics (absorption, distribution, metabolism and elimination)	Classroom Online Platform Computers and Pharmacokinetic Software Stella. Library Textbooks

		• The professor requests the study of the topic prior to the session.	• Describe your indications and contraindications • Apply the dosage of the medicine • Mention the routes of administration and their doses • List the most important interactions and adverse reactions **Attitudinal** • Rigor in the use of drugs • Objectivity in dosage • Discipline towards academic work • Consistency in academic work	

Stage 9. Medications used in the therapy of infectious diseases

Component(s) of the competence:

Classifies antibiotics used in the therapy of infectious diseases: Penicillins, Cephalosporins, Sulfonamides, Quinolones, Tetracyclines, Aminoglycosides, Chloramphenicol, Antifungal Macrolides, Antituberculosis, medications in treatment of Leprosy, Antivirals, Antiparasitics, Antiamibians, Antihelmintics, antimalarials, including their pharmacokinetics, pharmacodynamics, pharmacological effects, adverse effects and higher risk interdependencies to support their indications, contraindications and routes of administration.

Evidence of student learning	Performance Criteria	Learning activities	Content	Resources
Evidence 9: Resolution and evaluation (in the classroom) of a clinical case involving medications used in the therapy of infectious diseases.	• The resolution of the clinical case will be in class, individual and following the criteria established by the facilitator. • The review of concepts will be individual, in class, on the date and at the time established and according to the criteria established by the professor.	• The student exposes class in the classroom. • The professor guides the discussion and helps during the presentation. • The concepts treated and their expression in clinical pharmacokinetic curves are discussed. • Students analyze pharmacokinetic parameters and their behavior in a clinical case.	**Conceptual** • Betalactamics (penicillins and cephalosporins) • Sulfonamides • Quinolones • Tetracyclines • Aminoglycosides • Chloramphenicol • Macrolides • Antifungals • Treatment of Tuberculosis • Leprosy treatment • Antivirals	Classroom Online Platform Computers and Pharmacokinetic Software Stella. Library Textbooks

	• It will be delivered on a sheet of paper, handwritten and printed.	• Students present examples of the different mechanisms of action. • The professor makes final comments on the presentation and clarifies doubts and omissions. • The professor requests the study of the topic prior to the session.	• Antiparasitic (anthelmintic, antiamibian) • Anti-malaria **Procedural** • Classify the groups of medicines • Explain the pharmacodynamics (mechanism of action) of drugs • Explain pharmacokinetics (absorption, distribution, metabolism and elimination) • Describe your indications and contraindications • Apply the dosage of the medicine • Mention the routes of administration and their doses	

			• List the most important interactions and adverse reactions **Attitudinal** • Rigor in the use of drugs • Objectivity in dosage • Discipline towards academic work • Consistency in academic work	

Stage 10. Toxicology

Component(s) of the competence:

Classify the most common toxic substances, considering their sources of exposure, their toxicokinetics and toxicodynamics in order to establish an adequate diagnosis and treatment in case of intoxication.

Evidence of student learning	Performance Criteria	Learning activities	Content	Resources
Resolution of clinical case of intoxication (in the classroom).	• The student will be assigned a clinical case of an intoxicated patient.	• The student exposes class in the classroom. • The professor guides the discussion and helps during the presentation.	**Conceptual** • General treatment of intoxications • Heavy metals • Lead • Mercury	Classroom Online Platform Computers and Pharmacokinetic Software Stella. Library

	• Establishes a diagnosis of intoxication. • Explains how he came to that conclusion. • Describes at least 3 differential diagnoses and justifies them. • Describes and justifies the treatment of the intoxication. • A sheet of paper, handwritten and printed, will be provided.	• The concepts addressed are discussed. • The different processes of toxicokinetics are commented on. • The students analyze the toxicokinetic parameters and their behavior in the follow-up of a clinical case of intoxication. • Students present examples of the different mechanisms of action • The professor makes final comments on the presentation and clarifies doubts and omissions	• Arsenic • Asphyxiant gases • Caustic and corrosive • Hydrocarbons • Toxic alcohols • Methanol • Ethanol • Isopropane • Ethylene Glycol • Insecticides • Organophosphates • Carbamates • Pyrethroids • Organochlorines • Drug poisoning • Salicylates • Paracetamol • Antidepressants • Toxins of animal origin **Procedimental** • Classify the most common toxic substances • Explain toxicodynamics	Textbooks

		• The teacher requests the study of the topic prior to the session	• Explain toxicokinetics • Describe the sources of exposure • Make a diagnosis of intoxication • Know the treatments and antidotes available **Attitudinal** • Rigor in the use of drugs • Objectivity in dosage • Discipline towards academic work Consistency in academic work	

7. Summative Evaluation:

	Porcentaje
Resolution and evaluation (in the classroom) of a clinical case Stage 1	2
Resolution and evaluation (in the classroom) of a clinical case Stage 2	2
Resolution and evaluation (in the classroom) of a clinical case Stage 3	2
Resolution and evaluation (in the classroom) of a clinical case Stage 4	2
Resolution and evaluation (in the classroom) of a clinical case Stage 5	2

	Resolution and evaluation (in the classroom) of a clinical case Stage 6	2
	Resolution and evaluation (in the classroom) of a clinical case Stage 7	2
	Resolution and evaluation (in the classroom) of a clinical case Stage 8	2
	Resolution and evaluation (in the classroom) of a clinical case Stage 9	2
	Resolution and evaluation (in the classroom) of a clinical case Stage 10	2
	Oral presentation in class	10
	First partial	15
	Second partial	15
	Final Exam	30
	CIP	10
	TOTAL	**100%**

8. Course Integrative Product.

Resolution of clinical case(s), by teams, in which the application of a pharmacological treatment is performed, justifying the therapeutic indication according to the current condition and existing comorbidities. Also include a pharmacological description of the treatment administered. Attach two article references.

9. References

- Brunton, Chabner, Knollman. Goodman & Gilman Las Bases Farmacológicas de la Terapéutica. Mexico: McGraw Hill. 13ª Edición, 2019.
- Brunton Hilal-Dandan. Goodman & Gilman Manual de Farmacología y Terapéutica. México: McGraw Hill. 2015.
- Katzung, Masters, Trevor. Farmacología Básica y Clínica. México: McGraw Hill. 14ª Edición, 2019.
- Rang H. P; Dale M. Principios de Farmacología. España: Elsevier. 8ª Edición, 2016.
- Lewis S Nelson Robert S Hoffman, Mary Ann Howland, Neal A Lewin. Lewis L Golfrank, Silas W Smith. Golfrank´ Toxicologic Emergencies. 11ª Edición 2019.

APPENDIX.

ASSESSMENT AND WORKLOAD

Module workload		Number of hours	Percentage
Contact hours	Class-based instruction	65h (54.16%)	57.14%= 120 hours
	Oral presentation and participation in discussion forum	15h (12.5%)	
	Resolution of clinical cases	8h (6.66%)	
	Lab parctice	12h (10%)	
	Exam taking	5h (4.16%)	
	Course integrative product (CIP)	15h (12.5%)	
Independent study	Study	80h (88.88%)	42.85%= 90 hours
	Exam preparation	10h (11.11%)	
Total hours of the workload: 30 hours X 7 credits UANL/ECTS*		210 h	

*European Credit Transfer and Accumulation System
1 UANL credit = 30 hours

NOTE: Rubrics, checklists and evaluation formats are elaborated by using the performance criteria described in each stage of the module.

SUPLEMENTO COVID-19

Siguiendo las recomendaciones de la Secretaría de Salud del país y la Rectoría de la Universidad, ante la coyuntura de salud COVID-19, la organización de la docencia desde marzo del 2020, seguirá un modelo híbrido, donde la docencia se ajustará a los horarios aprobados por la Secretaría de Salud siguiendo un modelo de Presencialidad / No presencialidad en la medida en que las circunstancias sanitarias y la normativa lo permitan. Los estudiantes asistirán a las clases de manera no presencial mediante la transmisión de las mismas de manera síncrona/asíncrona vía “on line”.