FACULTY OF PHARMACY

STUDY PROGRAM 0916.1 PHARMACY

DEPARTMENT OF PHARMACOLOGY AND CLINICAL PHARMACY

APPROVED
at the meeting of the Commission for Quality Assurance and Evaluation of the Curriculum Faculty Pharmacy
Minutes No.2 of 21.12.2017
Chairwoman, PhD, assistant professor
Uncu Livia _____

APPROVED
at the Council meeting of the Faculty Pharmacy
Minutes No. 2 of 22.12.2017
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APPROVED
approved at the meeting of the chair Pharmacology and clinical pharmacy
Minutes No.6 of 07.11.2017
Head of chair, D.Sc., PhD, professor,
Gonciar Veaceslav _____

SILLABUS

DISCIPLINE: **INTERPRETATION OF LABORATORY ANALYZES**

Integrated studies

Type of course: **Free choice discipline**

Chișinău, 2017

I. INTRODUCTION

- **General presentation of the discipline: its place and role in specific competences formation of professional/specialty training program**

The course *Laboratory analyzes interpretation* is a component of the pharmaceutical education field and aims at studying and interpreting laboratory data frequently encountered in medical practice.

During lessons course are rendered general notions about laboratory data present under normal conditions and various pathological conditions not included in the study program of other disciplines, such as pharmaco- and phytotherapy and clinical pharmacy. The aim of the lesson course is to know the laboratory tests used to monitor various disease states, to study the data on the biochemical mechanisms involved in pathology, as well as the biochemical, immunological and genetic markers of various pathological conditions.

This course will help to provide advisory help to physicians and patients to establish a diagnosis and conduct effective and harmless medication use based on laboratory data.

- **Mission of the curriculum (aim) in professional training**

One of the main objectives of the optional course is to formulate a broad understanding of laboratory signs present under normal conditions and pathological conditions, with the aim of establishing a differential diagnosis and appropriate treatment.

- **Languages of the course:** Romanian.
- **Beneficiaries:** students of the fifth year, faculty of Pharmacy, specialty of Pharmacy.

II. MANAGEMENT OF THE DISCIPLINE

Code of the discipline			
Name of the discipline		**Laboratory analyses interpretation**	
Person(s) in charge of the discipline		Assistant professor, Scutari Corina	
Year	**V**	Semester	**9**
Total number of hours, including:			**60**
Lectures	**17**	Practical/laboratory hours	**-**
Seminars	**34**	Self-training	**-**
Form of assessment	**E**	Number of credits	**2**

III. TRAINING AIMS IN WITHIN THE DISCIPLINE

At the end of the discipline study, the student will be able to:

✓ ***At the level of knowledge and understanding:***

- To know the laboratory data present under normal conditions;
- to know the laboratory data present in various pathological conditions;
- to study the interdependence between changes in body fluids, cells and tissues and the state of health or disease;
- to study the interdependence between changes in body fluids, cells and tissues and the state of health or disease.

At the application level:

- To be able to interpret laboratory data;
- to be able to provide consultations to doctors and patients on curative and prophylactic measures to restore the values of laboratory markers modified in the disease.

- ***At the integration level:***
- To be able to establish the diagnosis of the disease by considering laboratory indices level;
- to be able to evaluate and perform the differential diagnosis of the diseases, taking into account the laboratory values;
- to be able to assess and establish the disease prognosis and treatment according to the laboratory test values.

IV. PROVISIONAL TERMS AND CONDITIONS

Student of year V requires the following:

- proven skills in fundamental and clinical sciences (physiology, pathophysiology, biochemistry, microbiology, pharmacology);
- digital skills (use of the Internet, document processing, spreadsheets and presentations, use of graphics software);
- ability to communicate and teamwork;
- qualities - tolerance, compassion, autonomy.

V. THEMES AND ESTIMATE ALLOCATION OF HOURS

Lectures, practical hours/seminars and self-training

No	Theme	Number of hours		
		Lectures	Practical hours	Self training
1.	Hematological medical analyzes. The cell elements in the blood. Erythrocytes. Hemoleukogramma (hemoglobin, hematocrit).	1	2	-
2.	Exploration of red blood cells (diameter, lifetime, V.S.H.)	1	2	-
3.	Platelets. Clotting. Coagulation Factors. Coagulation disorders (anaemia, thrombocytopenia, thrombocytosis)	1	2	-
4.	Leukocytes (monocytes, eosinophils, lymphocytes, neutrophils). Pathological changes of the leukocyte formula (leukocytes, leukopenia)	1	2	-
5.	Biochemical tests. Research on protein metabolism	1	2	-
6.	Research on carbohydrate metabolism	1	2	-
7.	Research on lipid metabolism	1	2	-
8.	Exploring the bone marrow. Research on mineral metabolism	1	2	-
9.	Classic evaluation of fermentation activity.	1	2	-
10.	Clinical summary urine test.	1	2	-
11.	Functional respiratory constants. Overall sputum examination.	1	2	-
12.	Coprological explorations	1	2	-
13.	Examination of the secretory function of stomach and duodenum.	1	2	-
14.	Immunological medical analyses	1	2	-
15.	Parasitological medical analyses	1	2	-
16.	Assessment of reproductive function and pregnancy: sex steroid physiology and reproductive function evaluation in men and women, laboratory assessment of pregnancy	1	2	-
17.	Oncogenes/tumor markers	1	2	-
Total		**17**	**34**	-

VI. REFERENCE OBJECTIVES AND CONTENT UNITS

Objectives	Conținut units
Chapter 1. Hematological and biochemical medical analyzes.	
✓ To know and interpret haematological medical analyses; ✓ to know and interpret normal and pathological biochemical values; ✓ to learn the etiopathogenesis, clinical picture and laboratory analysis of anemia, haemorrhagic diatheses; ✓ to know the clinical picture, differentiated diagnosis, evaluation and prognosis of diseases of the hepatobiliary, cardiovascular, endocrine system, taking into account the laboratory data	Anemias. Bleeding diatheses. Leukocytoses. Leukopenias. Trombocytopathias. Trombocytopenias. Trombocytosis. Hepatobiliary, cardiovascular disorders (atherosclerosis, hyperlipidemias, acute myocardial infarction), endocrine (hypo- and hyperthyroidism, diabetes).
Chapter 2. Classical evaluation of enzyme activity, secretory-motor function of the stomach and duodenum, urinal summary examination, coprologic examinations, respiratory functional constants, general sputum examination.	
✓ to know the clinical and laboratory manifestations of pancreatic disorders; ✓ to learn the clinical picture and laboratory values of stomach and duodenal diseases; ✓ to know the clinical and laboratory manifestations of hepato-biliary diseases; ✓ to know the subjective and objective manifestations, the values of the laboratory tests of the urinary tract; ✓ to learn the clinical symptoms and laboratory values of respiratory system diseases.	Pancreatitis. Cholecystitis. Gastritis. Gastro-duodenal ulcer. Diarrhea. Constipation. Acute and chronic hepatitis. Hepatic cirrhosis. Acute respiratory infections. Bronchitis. Pneumonia. Bronchial asthma. Pyelonephritis. Glomerulonephritis. Nephrolithiasis. Kidney failure.
Chapter 3. Immunological and parasitological medical analyses, reproductive function and pregnancy assessment (sex steroid physiology and reproductive function evaluation in men and women, laboratory assessment of pregnancy), tumor oncogenes/markers.	

Objectives	Conținut units
✓ To know and interpret hematological medical analyses, oncogenes/tumor markers in oncological disorders; ✓ to know the clinical and laboratory manifestations of immunodeficiency states; ✓ to know the subjective and objective manifestations, the values of laboratory tests of helminthiases; ✓ to learn the physiology of sex steroids and to assess the reproductive function in men and women, laboratory assessment of pregnancy.	Cancer. Leukemia. Cancer pain. Immunodeficiency disorders. Helminthiasis. Pregnancy. Sterility. Toxicoses of pregnancy.

VII. PROFESSIONAL (SPECIFIC (PC)) AND TRANSVERSAL (TC) COMPETENCES AND STUDY OTCOMES

✓ PROFESSIONAL (SPECIFIC) (SC) COMPETENCES:

PC1: knowledge, explanation and interpretation of hematological and biochemical medical analyzes; knowledge explaining and interpreting immunological and parasitological medical analyzes; knowledge of enzyme activity, secretory-motor function of the stomach and duodenum, urinal summary exam, coprologic examinations, respiratory functional constants, general sputum examination.

PC2: knowledge of the symptomatology of the respective disease according to the modification of the laboratory index for establishing the presumptive diagnosis and performing the differential diagnosis.

PC3: use and adaptation of knowledge in the field of pharmacology, pharmaco- and phytotherapy and clinical pharmacy in counseling patients about prophylactic and curative methods for the restoration of altered values of laboratory indices; knowing how to access and select online materials.

PC4: partaking into the scientific research circle and presenting individual scientific projects with new results in the field of interpreting laboratory analyzes.

PC6: the use of solving capabilities of situational problems, clinical cases, also information technologies to solve the tests, and the interpretation of laboratory analyzes and curative-prophylactic measures in the study program at optional discipline using digital technologies.

✓ TRANSVERSAL COMPETENCES (TC):

TC 1: Promoting laboratory analyzes necessary for the patient to establish the correct diagnosis; compliance with pharmaceutical ethics and deontology rules in interpreting laboratory tests.

TC 2: Formation of personal attitude; the interaction ability of pharmacist-patient, pharmacist-doctor types, group-efficient activity with different counseling roles; improving the decision-making autonomy in the preservation, selection and release of drugs aiming to normalization of laboratory values.

TC 3: Performing teamwork by carrying out scientific projects; promoting the spirit of initiative, dialogue and cooperation through various techniques of acquiring the material; critical analysis and formulation of conclusions to the pharmacist's daily activity.

✓ STUDY OUTCOMES

- To be able to assess the importance and role of interpreting laboratory analyzes in the context of clinical pharmacy and integrating with related pharmaceutical disciplines.
- To be able to select the drug groups used to restore lab values.
- To be competent to establish the diagnosis of the disease according to the clinical manifestations and the values of the laboratory analyzes.
- To apply pharmacological knowledge in the ability to explain contemporary prophylactic and curative methods for the normalization of laboratory indices.
- To possess the ability to select information from the literature (reference handbooks, manuals, compendia, pharmacotherapy guides, etc.).
- To be able to inform the patient about performing certain laboratory tests that will help establish the diagnosis.
- To be able to interpret lab analyzes by recommending the prophylactic and curative measures required by the patient until they reach the doctor.

VIII. STUDENT'S SELF TRAINING

No.	Expected Produc	Implementation Strategies	Assessment criteria	Implementation terms
	Working with information sources:	Read the lecture or the material in the manual to the theme carefully. Reading self-training questions in the subject that require reflection on the matter. To get acquainted with the list of additional information sources on the topic. Select the source of additional information for that theme. Reading the text entirely, carefully and writing the essential content. Wording of generalizations and conclusions regarding the importance of the theme/subject	Ability to extract the essentials; interpretative skills; the volume of work	During the semester
	Working with the practical hours' notebook:	Until solving the tasks in the notebook, analyze the information on the subject in the lecture and the manual. Solving consecutive tasks: brief characterization of laboratory data in various pathological conditions, solving clinical cases with explanation of laboratory data. Selection of additional information, using electronic addresses and bibliographic sources.	Workload, situational problem solving skills, ability to formulate conclusions	During the semester
	Preparing and defending presentations /portofolios:	Selection of the research theme, establishment of the research plan, setting the terms of realization. Establishing PowerPoint presentation components - theme, purpose, results, conclusions, practical applications, bibliography Peer reviews. Teacher reviews	The volume of work, the level of insight into the essence of the presentation, the level of scientific argumentation, the quality of the conclusions, the elements of creativity, the formation of the personal attitude, the coherence of the exposure and the scientific correctness, the graphic presentation, the way of presentation	During the semester

IX. METHODOLOGICAL SUGGESTIONS FOR TEACHING-LEARNING-ASSESSMENT

Teaching and learning methods used

The teaching of the Laboratory Analyses Interpretation discipline uses different didactic methods and procedures, oriented towards the efficient acquisition and achievement of the objectives of the didactic process. In the theoretical lessons, along with traditional methods (lesson-exposure, lesson-conversation, synthesis lesson), modern methods (lesson-debate, lecture-conference, problem-lesson) are also used. During practical hours are used following forms of activities: individual, frontal, group-based. Control work (characterization of preparations, indications in intoxications with various preparations) in writing to highlight the initial level of knowledge. Practical activities (group work): solving of situational problems and clinical case studies, demonstration of video films. During lessons and extracurricular activities are used Communication Technologies - PowerPoint presentations.

Verifying knowledge on questions from methodological guidelines and putting tasks on the next topic of practical hours (self-training homework).

Final: exam (semester IX).

- ***Applied teaching strategies/technologies (specific to the discipline);***

"Brainstorming", "Multi-voting"; "The round table"; "Group Interview"; "Case Study"; "Creative Controversy"; "Portfolio".

Methods of assessment *(including the method of final mark calculation).*

Current*:* frontal and/or individual control via:

- Motivation (current topic). Determining the purpose of practical hours, answering students' questions.
- Written control (test) to highlight the initial level of knowledge.
- Practical Activities: Solving of Problems and Questions in Methodological Instructions for Laboratory Work in Interpreting Laboratory Analyzes.
- Verification of final knowledge and assignment of tasks for the next topic of the practical work (self-training).

During the study year, there are two totalizations at the discipline Laboratory Analysis Interpretation. At the end of each semester, the student's self-training work is graded.

Thus, formative evaluation consists of two totalizations and one mark for self-training work.

The annual average is formed from the sum of the points accumulated during the study year based on the totalizations scores and the self-training work score

Final: At the Promotion Exam to Interpretation of Laboratory Analyzes, students with the average annual score below grade 5 are not admitted, as well as students who have not recovered absences from lectures and practical hours.

The Exam in the Laboratory Interpretation Analysis (summative assessment) is made up of the oral test, which is done by including two questions in the tickets for the OTC Preparations Pharmacotherapy and a Situational Problem.

Final mark consists of two components: average annual mark (coefficient 0.5) and oral test (coefficient 0.5)

Method of mark rounding at different assessment stages

INTERMEDIATE MARKS SCALE (annual average, marks from the examination stages)	National assessment system	ECTS Equivalent
1.00-3.00	2	F
3.01-4.99	4	FX
5.00	5	E
5.01-5.50	5.5	
5.51-6.0	6	
6.01-6.50	6.5	D
6.51-7.00	7	
7.01-7.50	7.5	C
7.51-8.00	8	
8.01-8.50	8.5	B
8.51-8.00	9	
9.01-9.50	9.5	A
9.51-10.0	10	

The average annual mark and the marks of all stages of final examination (computer assisted and oral test) - are expressed in numbers according to the mark scale (according to the table), and the final obtained mark is expressed in a number with two decimals, which is transferred to student's record-book.

Absence on examination without good reason is recorded as "absent" and equivalent to 0 (zero). The student has the right to have two re-examinations on failed subject.

X. RECOMMENDED LITERATURE

A. Mandatory:

1. Bălăeț C., Sevastre O..Medicina de laborator. București. 2003. 158 p.
2. Lotreanu V. Analize medicale. București. 2005. 183 p.
3. Nastoiu I. Bolile și analizele medicale. București. 2004. 203 p.
4. Soare I.. Analize medicale explicate. București. 2002. 62 p.

B. Additional:

1. Soare I.. Analize medicale explicate. București. 2002. 62 p.
2. Ţâbârnă I., Butorov V.Ghid de laborator clinic în practica medicală.Chișinău.1999.140 p.