

**Odessa National Medical University**  
 Faculty Pharmaceutical  
 Department Clinical Chemistry and Laboratory Diagnostics

Syllabus course

**“LABORATORY DIAGNOSTICS”**

<b>Amount</b>	60 hours /2,0 ECTS
<b>Semester, year of study</b>	4 years of study, 7 semester
<b>Days, time, place</b>	Venue: Odessa, st. Olgiivska, 4a (Main building of ONMedU), Department of Clinical Chemistry and Laboratory Diagnostics. Days and times of classes: According to the schedule of the educational department
<b>Teacher (s)</b>	<ol style="list-style-type: none"> <li>1. Docent Yasinenko Nina Yevhenivna</li> <li>2. Docent Storchylo Olha Vyacheslavivna</li> <li>3. Senior Lecturer Oliynyk Kathryn Victorovna</li> <li>4. Senior Lecturer Vasylieva Antonina Georhiivna</li> <li>5. Senior Lecturer Maryniuk Ganna Serhiivna</li> <li>6. Assistant Kostina Alina Anatoliivna</li> <li>7. Assistant Poplavska Nataly Andriivna</li> <li>8. Assistant Davydenko Veronika Leonidivna</li> </ol>
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<b>Workplace</b>	Odessa, street Olgiivska, 4a (Main building of ONMedU), Department of Clinical Chemistry and Laboratory Diagnostics.
<b>Consultations</b>	According to the schedule posted on the information stand of the department

**COMMUNICATION**

Communication with students will be carried out in the classroom.

During distance learning, communication is carried out through the Microsoft Teams platform, as well as through e-mail correspondence, through messengers Viber, Telegram, WhatsApp.

**COURSE ANNOTATION**

**The subject of the discipline is** to study modern methods of clinical diagnosis of diseases when using various biological materials as objects of study (whole blood, serum and plasma, urine, etc.)

**Prerequisites of the course:** To study the course students need basic knowledge of biological chemistry, physiology, anatomy, pathological physiology, pharmacology, pharmaceutical chemistry.

**Post requisites of the course:** Mastering the material of the discipline allows you to acquire knowledge and skills in courses of clinical pharmacy, pharmacotherapy with pharmacokinetics, drug toxicology, toxicological and forensic chemistry in the process of further training and professional activities.

**The purpose of the course:** To study modern methods of clinical diagnosis of diseases in the application of various objects of research: whole blood, serum and plasma, urine and other biological materials, as well as to provide students with practical skills necessary for independent carrying out of separate researches.

**Tasks of the discipline:**

- to apply knowledge of principles and methods of determining the main clinical measures;
- to analyze the laboratory values in the normal and in pathology;
- to apply knowledge of drug impact on the results of physical examination and the laboratory tests and the use of acquired knowledge in the process of further training and professional activities.

**Expected results**

As a result of studying the discipline the student must know:

- the importance of clinical laboratory studies;
- the international system of units of measurement;
- concepts of screening and constellations of laboratory tests, dispensary examination;
- causes of errors in laboratory diagnostics;
- basics of medical terminology;
- modern methods of research of blood, serum and plasma of blood, urine and other biological fluids;
- normal indicators of laboratory tests and their changes in pathological processes;
- principles of sanitary-anti-epidemic regimen in clinical-diagnostic laboratory;
- rules of safety during work in the Clinical Diagnostic Laboratory, observance of rules of personal hygiene, requirements of aseptic and antiseptic;
- features of workplace equipment during different studies;
- principles of production of reagents, washing of laboratory glassware, sterilization, disinfection;
- peculiarities of preparation of the patient for laboratory examination, taking of material, delivery to the laboratory, neutralization of biological material;
- forms and procedure of quality control of laboratory tests;
- current orders and instructions of the Ministry of Health of Ukraine.

Student should be able to:

- independently work with educational and reference literature;

- to equip a workplace;
- to carry out separate types of plasma (urine) blood, urine tests and evaluate the result of the study according to the criterion “norm / pathology”;
- work with modern laboratory equipment during clinical research: photoelectrocolorimeter, spectrophotometer, pH meter, centrifuge, etc .;
- observe safety rules while working in the Clinical Diagnostic Laboratory;
- maintain approved documentation and reporting;
- to determine the amount of proteins in the serum and preparations of protein origin;
- to carry out studies of physical and chemical parameters (glucose, ketone bodies, bilirubin, urobilin bodies, hemoglobin) of urine, sediment studies;
- to carry out research of acidity of gastric juice, enzymatic activity of gastric contents;
- to make calculations of received indicators;
- make transfers of data in the International System of Units;
- make generalizations and conclusions from the analysis data;
- evaluate the effectiveness of treatment with pharmaceuticals using the results of changes in blood, urine, sputum, etc.

## **COURSE DESCRIPTION**

### ***Forms and methods of teaching***

The course will be presented in the form of lectures (30 hours), practical classes (20 hours), organization of independent work of students (10 hours).

The main forms of teaching the discipline are: lectures, practical classes, independent work of students. The following teaching methods are used in teaching the discipline: lectures, explanations, conversations, multimedia presentations, laboratory work, problem solving, oral questioning, testing, etc.

Students' independent work is to study the material of lectures, as well as to prepare for and defend practical work, prepare for current and final control, perform training tests, search for information from literature and the Internet and conduct elements of scientific work.

Students' scientific work is carried out in the work of circles, preparation and speeches at scientific student conferences, writing articles.

### ***The content of the discipline***

Topic 1. Organization of the Clinical Diagnostic Laboratory.

Topic 2. The pathochemistry of carbohydrate metabolism.

Topic 3. The pathochemistry of lipid metabolism.

Topic 4. Blood composition and function.

Topic 5. Respiratory function of blood.

Topic 6. Hemostasis system and its disorders.

Topic 7. Laboratory studies for kidney and urinary tract diseases.

Topic 8. Laboratory studies in diseases of the digestive system.

Topic 9. Laboratory studies in diseases of the endocrine system.

Topic 10. Final Knowledge Control: Test

***The list of recommended textbooks:***

1. Zalubovska O.I., Zlenko V.V., Litvinova O.M. Drug influence on laboratory indices: Manual for students of medical and pharmaceutical higher schools and colleges – Kh., NuPh, 2014. 99 p.
2. Denise D. Wilson. McGraw-Hill Manual of Laboratory and Diagnostic Tests. McGraw-Hill Professional, 2008. 681 p.
3. Frances T Fischbach. A Manual of Laboratory and Diagnostic Tests, 7th edition. Lippincott Williams & Wilkins Publishers, 2003. 755 p.

**EVALUATION**

The results of students' academic performance are presented in the form of assessment on the national scale, 200-point and ECTS scale and have standardized generalized criteria for assessing knowledge:

national scale:

- “Excellent” (5) rating is awarded to a student, who is fluent in material of questionnaire, participates in discussion of debated questions, is able to write basic biochemical reactions occurring in the body, to identify key biochemical parameters in biologic objects and give them medical and biological assessment. He who realized the relationship of certain sections of the discipline, their importance for the future profession, showed creative abilities in understanding and using the curriculum, showed the ability to independently update and replenish knowledge; level of competence - high (creative).
- “Good” (4) rating is awarded to a student, who is fluent in material of questionnaire, able to write basic biochemical reactions occurring in the body, to identify key biochemical parameters in biologic objects and give them medical and biological assessment, but makes some minor errors in answers to questions and is capable of their independent updating and renewal in the course of further training and professional activity; level of competence - sufficient (constructive-variable);
- “Satisfactory” (3) rating is awarded to a student who is familiar with all questions of program and learned the themes of mandatory qualification minima, is able to identify key biochemical parameters in biological objects and give them medical and biological evaluation. One who has made some mistakes in answering the exam and in performing exam tasks, but has the necessary knowledge to overcome mistakes under the guidance of a researcher; level of competence - average (reproductive);
- “Unsatisfactory” (2) rating is awarded to a student who has significant gaps in knowledge of the program material, makes fundamental errors in explaining the laws of metabolism in humans; does not have the necessary practical skills; the level of competence is low (receptive-productive).

**Ongoing control**

Ongoing monitoring is done at each practical class through oral examination or written controls. After studying each section based on control of theoretical knowledge, skills and abilities the control of practical skills is carried out. The current educational activity of the student is evaluated in practical classes on a 4-point (traditional) scale.

Additional (bonus) points can be received for individual tasks:

- Participation and report in the student scientific conference;
- Report on the student scientific circle;
- Preparation of multimedia slides and tests;
- Translations of scientific articles from foreign languages;
- Abstract work on a particular topic.

The number of points accrued for different types of individual tasks depends on their scope and significance, and is determined by the standard and working programs of the discipline and is added to the sum of points scored by students for current academic activities for a particular section. Grades for individual tasks are given to the student only if they are successfully completed and defended. The grade is added to the current performance.

At the end of the study, the current performance is calculated - the average current score (the arithmetic mean of all current grades on a traditional scale, rounded to two decimal places).

### **The final control**

The form of final control is the credit. The credit is which involved the control of theoretical and practical training (practical skills and situational tasks).

The final control in the form of credit is assessed on a two-point scale:

- the grade "passed" is given to a student who has completed the curriculum of the discipline, has no academic debt and has an average score for current educational activity of not less than 3.00; level of competence - high (creative);

- the grade "not passed" is given to a student who has not fulfilled the curriculum of the discipline, has an academic debt (average score below 3.0 and / or absences); the level of competence is low (receptive-productive).

Conversion of the traditional grade from the discipline to 200-point is performed by the information and computer center of the university program "Contingent" according to the formula:

average grade point (current / discipline) x 40.

national scale:	points
«5»	185-200
«4»	151-184
«3»	120-150

According to the scores, students are evaluated on the ECTS rating scale. Students enrolled in one specialty are ranked on the ECTS scale on the basis of the number of points scored in the discipline as follows:

ECTS assessment	Statistical index
«A»	The best 10% of students
«B»	The next 25% of students
«C»	The next 30% of students
«D»	The next 25% of students
«E»	The next 10% of students

### **Individual independent work (IInW)**

Tasks for independent work are the general obligatory tasks highlighted in workbooks, which student should prepare for each class; making notes, filling out a workbook, learning vocabulary, studying subtopics that do not require explanation.

Students' independent work, which is provided by the topic of the lesson along with the classroom work, is assessed during the current control of the topic in the relevant lesson. Learning topics submitted only on independent work is checked during the credit.

## **COURSE POLICY**

### **Deadline and exam re-taking policy:**

It is expected that students will attend all lectures and practical classes. If they missed a class, it is necessary to re-work it (according to the schedule posted on the information stand of the department and according to the permission of the dean's office, if necessary).

Re-work of practical skills mastering controls is carried out during a semester individually with the decision of re-work time.

Unsatisfactory grades re-work is carried out in the last month of discipline study if the average score for the current educational activity is less than 3.00 (conducted according to the schedule posted on the department's information stand).

### **Academic Integrity Policy:**

Adherence to academic integrity by students involves:

- Independent performance of educational tasks, tasks of current and final control (current controls and credit in the discipline), and learning outcomes (for persons with special educational needs this requirement is applied according to their individual needs and capabilities);
- Links to sources of information in case of the use of ideas, developments, statements, information;
- Providing reliable information about the results of their own (scientific, creative) activities, used research methods and sources of information.

The following is unacceptable in educational activities for participants in the educational process: use of prohibited auxiliary materials or technical means (cheat sheets, abstracts, headphones, telephones, smart phones, tablets, etc.) during control measures.

For violation of academic integrity, students may be held liable for the following academic liability:

- Reduction of results of assessment of control work, examination, credit, etc.;
- Re-taking the assessment (test, exam, test, etc.);
- Appointment of additional control measures (additional individual tasks, controls, tests, etc.).

**Attendance and lateness policy:**

Attendance at lectures and practical classes is mandatory. If you are more than 15 minutes late, the lesson is considered missed and needs to be re-worked.

**Mobile devices:**

During practical classes, the use of a smart phone, tablet or other device is allowed for storing and processing information only with the permission of the teacher.

The use of mobile devices and their accessories is strictly prohibited during any control.

**Classroom behavior:**

The following is allowed during classes: leaving the classroom for a short time if necessary and with the teacher's permission; taking photos of presentation slides; taking an active part in the class.

The following is not allowed during classes: eating (except for persons whose special medical condition requires so; then medical confirmation is required); smoking, drinking alcohol and low-alcohol beverages or taking drugs; using obscene language or words that offend the honor and dignity of colleagues and faculty; playing games; damaging the materials and technical base of the university (inventory, equipment; furniture, walls, and floors damage, littering the premises and territories); crying, shouting or listening to loud music in classrooms and even in corridors during classes.