SLC. MS.040. LSO9001. 1693

SYLLABUS

INTERNATIONAL EUROPEAN UNIVERSITY

PROGRESSIO ET HUMANITAS

SCHOOL OF MEDICINE

"Medical Chemistry"
EPP – 222 "Medicine"

2024

SYLLABUS

1 Name of the course and educational program

"Medical Chemistry"
EPP – 222 "Medicine"

2 Course description

Medical chemistry is a complex discipline that considers the basic concepts, provisions and laws of inorganic, analytical, physical and colloidal chemistry and their application in theoretical and practical medicine.

3 Background of study

Medical chemistry is based on the knowledge of chemistry previously obtained by students at the educational institution of the pre-university level of education.

4 Amount of credits/hours

3 ECTS credits / 90 academic hours

5 Training format

Blended learning

6 Classroom Location

4th floor, room 404

7 Full name of the teacher

Morozov-Leonov Svyatoslav, Doctor of Biological Sciences, Associate Professor of the Department of Fundamental and Medical- Preventive Disciplines, Scientific Research Institute "EMS"

8 Pulpit

Department of Fundamental and Medical-Preventive Disciplines of the Scientific Research Institute "EMS"

9 Office Location

Kyiv, Akademika Glushkova Ave., 42 V, office. 423

10 Counseling

Thursday from 14:00 to 15:30 with prior registration via corporate mail

11 Teacher's e-mail

sviatoslavmorozov-leonov@ieu.edu.ua

12 Course Objectives

The study of "Medical Chemistry" provides the student with a basis for mastering the following disciplines: as physiology, biological and bioorganic chemistry, microbiology, pharmacology and toxicology, hygiene and ecology. The systematic study of the most important theoretical issues of chemistry will allow future doctors to apply them to reveal the essence of physical and chemical processes occurring in a living organism. This will contribute to a better assimilation of other theoretical and clinical disciplines, the formation of scientific thinking in them. Training of specialists who need knowledge of medical chemistry requires not only theoretical training, but also versatile practical skills and abilities in conducting a chemical experiment.
PRN1. Have thorough knowledge of the structure of professional activity. Be able to carry out professional

13 The role of the academic discipline in achieving program results

activities that require updating and integration of knowledge. Be responsible for professional development, the ability to further professional training with a high level of autonomy
PLO 2. Understanding and knowledge of basic and clinical biomedical sciences, at a level sufficient to solve professional problems in the field of health care
PLO 21. To search for the necessary information in professional literature and databases and other sources, to analyze, evaluate and apply this information
PLO 24. Organize the necessary level of individual safety (own and those of the person he cares for) in case of typical dangerous situations in the individual field of activity.

14 Learning outcomes

Upon completion of the course, applicants should know:
- determining the necessary list of laboratory and instrumental studies and evaluating their results;
- features of the structure of complex compounds as a basis for their use in chelation therapy;
- characteristics of the quantitative composition of solutions;
- quantitative content of acids and bases in the solution using acid-base titration methods;
- mechanism of action of buffer systems and their role in maintaining acid-base balance in biosystems;
- relationship between colligative properties and concentration of solutions;
- thermal effects of chemical and biochemical processes;
- thermodynamic functions to assess the directionality of processes, to explain energy conjugation in living systems;
- dependence of reaction rate on concentration and temperature;
- conditions for the formation and dissolution of precipitates, explain the role of heterogeneous equilibria with the participation of salts in the general homeostasis of the body;
- mechanism of formation of electrode potentials;
- features of the structure of the surface layer of adsorbed molecules of surfactant compounds, principles of the structure of biological membranes;
- adsorption equations and limits of their use;

14 Learning outcomes

- regularities of adsorption of substances from solutions on a solid surface;
- physicochemical foundations of adsorption therapy methods;
- principles of methods for obtaining and purifying colloidal-dispersed solutions;
- physical and chemical properties of proteins, which are structural components of all tissues of the body.

15 Course Content

Topic 1. The structure of atoms, the periodic law and the periodic table of elements. Chemical bond. Complex compounds
Topic 2. Biogenic s-, p- and d- elements: chemical properties, biological role, application in medicine
Topic 3. Basic laws of chemical thermodynamics and their application. Bioenergetics.
Topic 4. Chemical kinetics as a basis for studying the rate and mechanism of biochemical reactions. Catalysis. Chemical equilibrium
Topic 5. Solutions, their composition and types. The importance of aqueous solutions in biology and medicine. Topic 6. Colligative properties of dilute solutions
Topic 7. Equilibrium in electrolyte solutions. pH of biological fluids. Buffer systems, their biological role
Topic 8. Basics of titrimetric analysis.
Topic 9. Electrode processes and their importance for physiology and medicine
Topic 10. Physical chemistry of surface phenomena and their practical significance in biology and medicine
Topic 11. Colloidal solutions: preparation, purification and properties. Coagulation of colloidal solutions.
Topic 12. Properties of biopolymer solutions

16 Books and materials

1. Medical Chemistry: Textbook / V.O. Kalibabchuk, I.S. Chekman, V.I. Galinska et al.; per row. V.O. Kalibabchuk. — 4th Edition. – Kyiv: VSV "Medicine", 2019. – 336 p. (in Russian).
2. Medical Chemistry: Textbook / V.P. Muzychenko, D.D. Lutsevych, L.P. Yavorska; per row. B.S. Zimenkovsky. – 3rd ed., ed. – Kyiv: VSV "Medicine", 2018. – 496 p. (in Russian).
3. Medical chemistry: textbook/ Moroz A.S., D.D. Lutsevich, L.P. Yavorska. - Vinnytsia: New Book, 2008. –776 p. (in Russian).
4. Medical Chemistry: Textbook / Gomonai V.I., S. Milovych, - Vinnytsia: New Book, 2016. – 672 p. (in Russian).

17 Technical requirements for working on the course

To work while studying the discipline "Medical Chemistry", you need regular access to computer (or phone) and the Internet. The classroom for teaching the course is equipped with microscopes, sets of necessary drugs.
To successfully study and pass the exam for the training course, you must first familiarize yourself with the Classroom remote platform and study all the folders that already have/or will be placed in stages information or materials for studying the course. You will also need to upload and create documents, upload a completed task, watch a video or create one. The ability to use remote platforms is possible only with the use of corporate mail.
If it is impossible to enter the course, you need to inform the management of the ESI EMS, or the headman, or directly the course teacher.

If it is impossible to enter the course, you need to inform the management of the ESI EMS, or the headman, or directly the course teacher.

18 Learning process

The process of studying the course "Medical Chemistry" includes lectures and practical classes.
During lectures, teaching methods such as lecture will be used; problem-oriented lecture, lecture-conversation, lecture-discussion, demonstration, analysis of cases in accordance with the topic of lectures.
During practical classes, such teaching methods as surveys, testing, individual and team tasks, thought-pair-share, preparation of reports and presentations, work in small groups, solved specific tasks and situations, brainstorming (brainstorming, brainstorming), work with the interactive Labster platform will be used.

19 Signs of discipline

Term of teaching	Semester	International Disciplinary Integration	Course year (training)	Cycles: General Training/ Professional Training/ Free Choice
1 semester	1st semester	yes	1 year	General training cycle

20 Grading Policy

Assessment of knowledge and skills during the semester is possible in various ways. The teacher assesses class attendance, activity during a lecture or practical lesson, discussion of problematic issues, quality and timely completion of tasks and tests, ability to present his report, and independent work.

Activities during the semester	Maximum number of points during the semester
Current work (attendance, oral interview, participation in discussion) (8 during the semester)	32 (4x8)
Solving situational problems (7 during the semester)	35 (5x7)
Presentations (4 during the semester)	20 (5x4)
Tests (7 during the semester.)	35 (5x7)
Modular test work (1 semester)	18
Labster Interactive Platform (3 works)	60 (3x20)
Together	**200**

21 Grading scale

The maximum number of points that a student can score for current educational activities when studying the discipline is 200 points, the minimum number of points is 120 points.
The calculation of the number of points is carried out on the basis of the grades received by the student on a 4-point (national) scale during the study of the discipline, by calculating the arithmetic mean, rounded to two decimal places.
The student receives credit at the last lesson in the discipline based on the results of modular control work and current assessment. Only those students who do not have academic debt and their average score for current academic activities in the academic discipline is at least 3.00 (120 points) are allowed to take credit.
The average score for current activities is converted into points on a 200-point scale, according to the conversion table (Table 1). 1. Regulations on the organization of educational activities).
The learning result is also evaluated on a two-point scale (enrolled/not enrolled).

According to the national system	**On a 200-point scale**
Enrolled	from 120 to 200 points
not credited	less than 119 points

22 How to find out your score

To check your grades for assignments and read the teacher's comments, you should check the relevant tabs of the Classroom or Moodle distance learning platforms.
You can also get information about the grades received directly from the course teacher through corporate mail or by appointment on the days of consultations (room 423).

23 Course Policy

For productive educational and cognitive activities of students when studying the discipline, practical classes are carried out in the form of presentations, group work, seminars-discussions.
During his stay on the territory of the IEU and in classes, the student must respect teachers, staff and other students, attend classes according to the schedule, come on time and not leave the classroom without the permission of the teacher. It is necessary to complete all academic tasks and work within the specified deadlines.
The teacher, in turn, must constantly improve his professional level, pedagogical skills, general culture, provide conditions for students to assimilate curricula at the level of mandatory requirements for the content, level and scope of education, promote the comprehensive professional development of students. It is imperative to adhere to the curriculum, not to be late for classes, to prevent any manifestations of corruption, discrimination, bullying, harassment and infringement of the rights of students.
A student who, ***for valid reasons,*** confirmed by documents, was not subject to current control, has the right to undergo current control within two weeks after returning to study.
A student who was absent from classes ***without a valid reason,*** did not participate in current control measures, did not liquidate academic debt, is not allowed to the final semester

23 Course Policy

control of knowledge in this discipline, and on the day of passing the exam in the exam sheet, the scientific and pedagogical worker gives a grade of "not admitted". Re-passing the exam in the discipline is assigned under the condition of performing all types of educational, independent (individual) work provided for by the working curriculum of the discipline, and is carried out in accordance with the liquidation schedule approved by the directorate.

All participants in the educational process are guided by the principles of academic integrity.

24 Completing the task late, correcting grades, working out

Assignments must be submitted via Classroom or Moodle before the completion deadlines specified in the course schedule on our website. Most of the tasks must be completed by 09:00 on the day of the next lesson in order to align them with the content of the course and activities in the group. It is best practice to complete the assignment as soon as possible after receiving it so that you have enough time to actively participate in the class.

If you need more time to complete a task, flexible deadlines are available. Completed assignments are accepted for full credit until the last lesson in the discipline according to the schedule, after which a 40% partial credit based on the grade received will be awarded within a week after the last day of classes. Tasks that did not pass at all will receive 0.

If you plan to miss classes for more than one week due to illness or other reasons, please contact your instructor to arrange alternative assignment options.

Remember that deadlines work both ways, and meeting them will ensure that the instructor provides timely feedback on your assignments to ensure that you keep up with the course.

25 Teacher's response time

Through corporate mail, within a week.

26 Effective communication

Effective communication is not only about being able to speak, but also about being able to hear!!
Therefore, the main recommendations for effective communication are corporate e-mail directly with the course teacher; this is personal communication with classmates through social networks/corporate mails/mobile phones; this is communication directly on the course of distance platforms Classroom or Moodle; This is a face-to-face meeting with the teacher on the days of consultations.

27 Course Materials Publication and Distribution Policy

Students may not post, publish, sell, or otherwise publicly distribute course materials without the written permission of the instructor!
Such materials include, but are not limited to: lecture notes, lecture slides, video or audio recordings, assignments, problem sets, exams, other students' papers, and answer keys.
Students who sell, post, publish, or distribute course materials without written permission for the purpose of obtaining answers or otherwise may be subject to disciplinary action, up to and including the requirement to refuse to study. In addition, students may not make video or audio recordings of classes for their own use without written permission from the instructor.

28 Expected workload and student engagement

For work in this course, hours are necessarily provided for independent study of materials and preparation for practical classes (approximately 5-6 hours per week).
If circumstances arise that force you to spend more time on any of the tasks, inform the teacher by e-mail.
An extension of the deadline is possible only if the teacher is informed in advance that you will not be able to submit the assignment on time. Students are expected to have a backup plan in case of computer failure or internet outages.

29 Support

Electronic timetable
Library
Repository
Directorate of the School of Medicine

30 Course Schedule

Title of the lecture topic	Practical classes
Periodicity of properties of chemical elements and their compounds. Chemistry of biogenic elements. The use of complex compounds in medicine.	1. Oral Survey 2. Practical tasks 3. Tests
Basic concepts and laws of chemical thermodynamics. Bioenergetics	1. Oral Survey 2. Practical tasks 3. Tests
Kinetics of biochemical reactions. Features of enzymatic catalysis. Chemical equilibrium and equilibrium constants	1. Oral Survey 2. Practical tasks

	3. Tests 4. Labster
Solutions and their role in the course of biochemical processes. Colligative properties of dilute solutions.	1. Oral Survey 2. Solving situational problems 3. Tests
Theory of acids and bases. pH of biological fluids. Buffer systems, their biological role	1. Oral Survey 2. Solving situational problems 3. Presentation of reports 4. Checking the issues that are submitted for independent study
The role of surface phenomena in the processes occurring in the body	1. Oral Survey 2. Solving situational problems 3. Presentation of reports
Physical chemistry of dispersed systems	1. Oral Survey 2. Tests 3. Labster
Biological macromolecules: structure, solutions of biopolymers, Properties.	1. Oral Survey 2. Solving situational problems 3. Tests

31 Tips for successful study in the course

Tell me - and I will forget, teach me - and I can remember, involve me - and I will learn, said Benjamin Franklin.

If you want to successfully master this subject, you must be:
- persistent, attentive and inquisitive;
- creative and cheerful, open to communication and discussion;
- ready to receive and share information on the subject not only at lectures, but also in extracurricular time.

See you!