

MINISTRY OF HEALTH OF UKRAINE
ODESA NATIONAL MEDICAL UNIVERSITY
Department of Pharmaceutical Chemistry and Drug Technology

Syllabus of the educational discipline
"General and inorganic chemistry"

Scope of the educational discipline	Total hours per discipline: 180 hours, 6 credits. Semesters: I-II. 1 st year.
Days, time, place of the education discipline	According to the schedule of classes. Department of Pharmaceutical Chemistry. Odesa, st. Marshal Malinovskyi, 37.
Teacher (-s)	Docent Lozhichevska Tatyana. Senior Lecturer Nikitin Olexii. Assistants: Lytvynchuk Iryna, Ulizko Igor, PhD Holubchuk Khrystyna.
Contact Information	Help by phones: Nikitin Olexii, head teacher of the department 067-485-11-06 Klyvniak Iryna, senior laboratory assistant 0487779828 E-mail: pharmchemistry@onmedu.edu.ua Face-to-face consultations: from 2:00 p.m. to 5:00 p.m. every Thursday, from 9:00 a.m. to 2:00 p.m. every Saturday. Online consultations: from 4:00 p.m. to 6:00 p.m. every Thursday, from 9:00 a.m. to 2:00 p.m. every Saturday. The link to the online consultation is given to each group during the classes separately.

COMMUNICATION

Communication with applicants will be conducted in the classroom (face-to-face).

During distance learning, communication is carried out through the Microsoft Teams platform, as well as through e-mail correspondence, Viber messengers (through groups created in Viber for each group, separately through the head of the group), Telegram.

ABSTRACT OF THE EDUCATIONAL DISCIPLINE

Subject of discipline study – the relationship between chemical processes and the phenomena that accompany them, the regularities between the chemical composition, the structure of substances and their properties, establishing the probability of course and the directionality of chemical reactions, determining the

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function of substances in acid-base and redox processes, physico-chemical bases of the use of inorganic substances in medicine and pharmacy.

Prerequisites: knowledge of chemistry (terminology, basic laws and concepts), physics (physical terminology, basic physical laws of the existence of matter), biology (biological role of chemical elements), mathematics (knowledge of basic mathematical operations, performing arithmetic and algebraic calculations when solving chemical problems).

Postrequisites: assimilation of knowledge of inorganic chemistry and its application for further study of the cycle of chemical, biological, medical disciplines, and will also be widely used in the practical work of a specialist.

Goal – formation of the initial level of knowledge of students, necessary for the further successful study of chemical and special disciplines and the implementation of professional tasks, instilling in students the skills of chemical thinking and generalization of experimental results, the ability to analyze the properties of substances and predict the possibility of their interaction, products of chemical transformations and offer conditions for their storage and possible methods of analysis.

Tasks of the discipline: Formation of basic chemical concepts in students; Awareness of the relationship between the composition and structure of substances and their properties; Mastering the basic patterns of chemical processes; Use of theoretical knowledge in solving practical tasks; The development of chemical thinking, the ability to independently acquire scientific knowledge of chemistry.

Expected results:

As a result of studying the educational discipline, the applicant must:

- *Know:* basic concepts and laws of chemistry; terminology and nomenclature of chemical compounds; regularities of the course of chemical processes, the basis of modern theories of the structure of the atom and chemical bonding; physical and chemical properties of elements and their most important compounds; physico-chemical bases of the use of inorganic substances in medicine and pharmacy.
- *Be able:* apply chemical concepts and laws, adapt the acquired knowledge to solve practical problems; to classify elements, compounds, chemical processes in accordance with modern chemical nomenclature; perform calculations according to the equation of chemical reactions, determine the yield of the product, find the thermal effects of the reaction; determine the possibility of a chemical process and its direction under standard conditions; based on the position of the element in the PS, determine the structure of its atom, predict its degree of oxidation in compounds and its chemical properties; to find connections between the composition of a substance, its structure and chemical properties; determine the possible formation of various types of chemical bonds; use educational, scientific and reference literature.
- *to master skills:* the ability to abstract thinking, analysis and synthesis, the ability to learn and be modernly educated; knowledge and understanding of the subject

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area and understanding of professional activity; ability to apply knowledge in practical situations; the ability to communicate in the state language; ability to adapt and act in a new situation; with determination and persistence in relation to assigned tasks and assumed responsibilities.

DESCRIPTION OF THE EDUCATIONAL DISCIPLINE

Forms and methods of education. The course will be taught in the form of lectures (30 hours) and practical classes (60 hours), organization of students' independent work (90 hours).

Teaching methods are used during practical classes: multimedia presentation is used in lectures; in practical classes – teaching and methodical materials, situational tasks, individual tasks, laboratory equipment, for testing acquired knowledge and skill tests and calculation tasks, for independent work a list of necessary literary sources is provided.

Content of the education discipline

Topic 1. Introduction to the study of general and inorganic chemistry. Basic concepts and laws of chemistry.

Topic 2. The structure of an atom and its electron shells.

Topic 3. Atomic nucleus. Radioactivity. Nuclear reactions.

Topic 4. D. I. Mendeleev's periodic law and its interpretation based on the electronic structure of atoms.

Topic 5. Chemical bond and structure of molecules.

Topic 6. Classes and nomenclature of inorganic compounds. Oxides, peroxides, peroxides, ozonides and hydroxides.

Topic 7. Energetics and directionality of chemical processes.

Topic 8. Speed of chemical reactions.

Topic 9. Catalysis.

Topic 10. Ways of expressing the quantitative composition of solutions.

Topic 11. Properties of solutions of electrolytes and non-electrolytes.

Topic 12. General characteristics of hydrolysis of salts.

Topic 13. Redox reactions.

Topic 14. Complex compounds.

Topic 15. Introduction to the chemistry of elements and their compounds. Properties of metals and non-metals.

Topic 16. General characteristics of s-elements. Physical and chemical properties of simple substances and compounds of elements of group IA. Hydrogen.

Topic 17. Physical and chemical properties of simple substances and compounds of elements of group IA. A subgroup of alkali metals.

Topic 18. Physical and chemical properties of simple substances and compounds of elements of the IIA group.

Topic 19. General characteristics of p-elements. Physical and chemical properties of simple substances and compounds of IIIA group elements.

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Topic 20. Physical and chemical properties of simple substances and compounds of elements of group IVA. Properties of carbon, silicon and their compounds.

Topic 21. Physical and chemical properties of simple substances and compounds of elements of group IVA. Elements of the Germany subgroup.

Topic 22. Physical and chemical properties of simple substances and compounds of VA group elements. Nitrogen.

Topic 23. Physical and chemical properties of simple substances and compounds of VA group elements. Phosphorus.

Topic 24. Physical and chemical properties of simple substances and compounds of VA group elements. Elements of the Arsen subgroup.

Topic 25. Physical and chemical properties of simple substances and compounds of elements of the VIA group. Oxygen.

Topic 26. Physical and chemical properties of simple substances and compounds of elements of the VIA group. Sulphur. Selenium and Tellurium as analogues of Sulphur.

Topic 27. Physical and chemical properties of simple substances and compounds of VIIA group elements. A subgroup of halogens.

Topic 28. Physical and chemical properties of noble gases.

Topic 29. General characteristics of d-elements. Elements IIIB, IVB, VB groups.

Topic 30. Physical and chemical properties of simple substances and compounds of VIB group elements.

Topic 31. Physical and chemical properties of simple substances and compounds of VIIB group elements.

Topic 32. Physical and chemical properties of simple substances and compounds of VIIIB group elements.

Topic 33. Physical and chemical properties of simple substances and compounds of elements of group IB.

Topic 34. Physical and chemical properties of simple substances and compounds of elements of the IIB group.

Recommended literature list:

Basic:

1. General and Inorganic Chemistry / Levitin Ye.Ya., Vedernikova I.A. – Kharkiv: Publishing House of NUPh: Golden Pages, 2009. – 360 p.
2. Inorganic Chemistry. 5th Edition // D. Shriver, M. Weller, T. Overton, J. Rourke, F. Armstrong. - Freeman/Worth, 2010. – 830 p. ISBN-13: 9781429299060.
3. Principles of Inorganic Chemistry // B. W. Pfennig. – Wiley, 2015. - 760 p. ISBN: 978-1-118-85910-0.

Information resources:

1. Methodical instructions on general and inorganic chemistry for independent and classroom work of students of the Faculty of Pharmacy (Content module 1. General chemistry).

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Access method: http://meduniv.lviv.ua/files/kafedry/bioneorgan/1_Navchalno-org_robota/Metodychne_zabezpechennaj/Metod_Inorganic_chem_1_pharm_M-1.pdf

2. Methodical instructions on general and inorganic chemistry for independent and classroom work of students of the Faculty of Pharmacy (Content module 2. Inorganic chemistry). Access method: http://meduniv.lviv.ua/files/kafedry/bioneorgan/1_Navchalno-org_robota/Metodychne_zabezpechennaj/Metod_Inorganic_chem_1_pharm_M-2.pdf
3. Methodical instructions on general and inorganic chemistry for independent work of students of the pharmaceutical faculty of correspondence form of study. Access method: http://meduniv.lviv.ua/files/kafedry/bioneorgan/1_Navchalno-org_robota/Metodychne_zabezpechennaj/metod_1_pharm_zaoch.pdf
4. Collection of test tasks in general and inorganic chemistry for students of the Faculty of Pharmacy. Access method: http://meduniv.lviv.ua/uploads/repository/bioneorgan/1_Navchalno-org_robota/Tests/Neorgan_Chem_Tests.pdf
5. <http://chemistry.inf.ua>

EVALUATING

Forms and methods of current control: oral survey, testing, evaluation of practical skills, problem solving.

Current evaluation criteria in practical training

Evaluation	Evaluation criteria
“5”	The applicant takes an active part in the discussion of the most difficult questions on the topic of the lesson, gives at least 90% correct answers to standardized test tasks, answers written tasks without errors, performs practical work and issued a protocol.
“4”	The applicant participates in the discussion of the most difficult questions on the topic, gives at least 75% correct answers to standardized test tasks, makes some minor mistakes in the answers to written tasks, performs practical work and draws up a protocol.
“3”	The applicant participates in the discussion of the most difficult questions on the topic, gives at least 60% correct answers to standardized test tasks, makes significant mistakes in answers to written tasks, performs practical work and draws up a protocol.

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“2”	The applicant does not participate in the discussion of complex questions on the topic, gives less than 60% correct answers to standardized test tasks, makes gross mistakes in answers to written tasks or does not give answers to them at all, does not perform practical work and does not draw up a protocol.
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Forms and methods of final control: the applicant is admitted to the exam on the condition that the requirements of the educational program are met and if he received at least 3.00 points for the current educational activity.

Possibility and conditions of obtaining additional (bonus) points: not provided.

INDEPENDENT WORK OF HIGHER EDUCATION ACQUIRES

Independent work involves preparation for each practical session.

EDUCATIONAL DISCIPLINE POLICY

The policy on deadlines and rescheduling corresponds to the general rules at ONMedU. Absences of classes for non-respectable reasons will be worked out according to the schedule of the teacher on duty. Absences for valid reasons are worked out according to an individual schedule with the permission of the dean's office.

Observance of academic integrity by applicants is mandatory, namely: Independent performance of all types of work, tasks, forms of control provided for by the work program of this educational discipline; references to sources of information in the case of using ideas, developments, statements, information; compliance with the legislation on copyright and related rights; provision of reliable information about the results of one's own educational (scientific) activity, used research methods and sources of information.

Attendance and Tardiness Policy:

Uniform: a medical gown that completely covers the outer clothing.

Equipment: notebook, pen.

State of health: applicants suffering from acute infectious diseases, including respiratory diseases, are not allowed to attend classes.

A student who is late for a class can attend it, but if the teacher has put "nb" (absent) in the journal, he must complete it in the general order.

Use of mobile devices:

Mobile devices may be used by students with the permission of the instructor

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if they are needed for the assignment.

Behavior in the audience:

The behavior of applicants and teachers in the classrooms must be working and calm, strictly comply with the rules established by the Regulations on academic integrity and ethics of academic relations at Odessa National Medical University, in accordance with the Code of Academic Ethics and University Community Relations of Odessa National Medical University, Regulations on Prevention and detection of academic plagiarism in research and educational work of students of higher education, scientists and teachers of Odessa National Medical University.