

Секція 5. НАУКОВІ ОСНОВИ ГУМАНІТАРНОЇ ПІДГОТОВКИ СТУДЕНТІВ

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ОРГАНІЗАЦІЯ ТА КОНТРОЛЬ САМОСТІЙНОЇ РОБОТИ СТУДЕНТІВ-ІНОЗЕМЦІВ ПІД ЧАС ВИВЧЕННЯ ХІМІЧНИХ ДИСЦИПЛІН

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Розглянуто сучасні підходи до організації та контролю самостійної роботи студентів-іноземців під час вивчення хімічних дисциплін. Відзначено, що підвищенню якості самостійної роботи сприяє поєднання її різних видів та форм, використання тестового контролю її виконання.

Ключові слова: хімічні дисципліни, самостійна робота, студенти-іноземці.

ОРГАНИЗАЦИЯ И КОНТРОЛЬ САМОСТОЯТЕЛЬНОЙ РАБОТЫ СТУДЕНТОВ-ИНОСТРАНЦЕВ ПРИ ИЗУЧЕНИИ ХИМИЧЕСКИХ ДИСЦИПЛИН

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Рассмотрены современные подходы к организации и контролю самостоятельной работы студентов-иностранцев при изучении химических дисциплин. Отмечено, что повышению качества самостоятельной работы способствует сочетание ее разных видов и форм, использование тестового контроля ее выполнения.

Ключевые слова: химические дисциплины, самостоятельная работа, студенты-иностранцы.

ORGANIZATION AND CONTROL OF FOREIGN STUDENTS' SELF-STUDY AT LEARNING CHEMICAL SUBJECTS

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Modern approaches to self-work for foreign students at studying chemical disciplines in Kharkov State University of Food Technology and Trade and in V.N. Karazin Kharkov National University is discussed in the article.

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By the results of quiz given to foreign students it is determined that the most interesting form of self-work for them is practical exercises and laboratory works in a large group as well as independently. Foreign students consider tests and oral quiz to be the most effective forms of self-work examination.

It is also established that use of informational communication technologies in organization of foreign students' self-work in the branch of chemistry is good to get deep knowledge and help them form corresponding professional and personal qualities.

It is appointed that different types and forms as well as test control help to increase self-work quality.

Keywords: *chemical disciplines, self study, foreign students.*

Formulation of the problem in general. Recently, the number of foreign students studying at universities in Ukraine has significantly increased. Thus, over the past five years the number of foreign students in Kharkov State University of Food Technology and Trade increased from 80 to 450 people. Most of them came from Turkmenistan, China, Africa and the Middle East. Some of them are studying at the Faculty of Commodity Analysis and Commercial Activities. The curriculum for students at "Commodity and commercial enterprise" includes chemical disciplines, such as "Chemistry", "Identification of plastics" and others.

In V.N. Karazin Kharkov National University foreign students are mostly enrolled in the Faculty of Medicine. Training at "Medical business" involves the study of the subject "Medical Chemistry" during the first year.

Traditional forms of training in studying chemical subjects are lectures, laboratory and selfwork. Moreover, class hours are given no more than 50% of total class time. A significant amount of training material is submitted to independent study that is very complex to foreign students because of their initial gap in knowledge of chemistry at the stage of admission to universities and school training gaps in the countries. Therefore, the organization and control of foreign students' self-work in the process of teaching them chemical subjects is actual.

Analysis of recent research and publications. Literature review showed that the optimization of teaching foreign students and organizing their independent work in the process of studying chemical subjects gained special attention. Thus, teachers of Ternopil State Medical University named after I.Gorbachevsky introduced the method "one day", which means "one day - one subject" (e.g. pharmaceutical chemistry). No other subjects are taught that day. The classes last 6 or 7 academic hours. Web-page of the Department of Pharmaceutical Chemistry hosts training materials for practical work and lecture notes on the subject "Pharmaceutical Chemistry", presentations, training videos, etc. Additionally, the teachers elaborated guidelines for workshops and workbooks for practical classes' protocols in

English. Application of these materials allows foreign students to save time preparing for classes and releases time for their self-study.

Ivano-Frankivsk National Medical University proposed to use teaching aids in Russian and English for practical and laboratory classes on the subject "Medical Chemistry" to improve the quality of foreign students' self-training. While teaching "Chemistry" in Ukrainian language at the preparatory department foreign students use guidelines containing examples of tests, tasks, control issues and tasks for self-work. Also, the teachers issued terminological chemical dictionary [3].

The purpose of the article is to give examples and explain modern approaches to the organization of foreign students' self-work during their study of chemical sciences in Kharkiv State University of Food Technology and Trade and V.N. Karazin Kharkiv National University.

The main material research. In KhSUFT the students of the field of training "Commodity and commercial enterprise" start studying "Chemistry" in the first semester from the module "General principles of analytical chemistry." The total number of training hours per module is 144, of which in-class learning takes 90 hours (44 hours are the lectures, and 46 hours of laboratory work).

During the course the students are invited to perform extracurricular, creative and self-work. Extracurricular self-study includes work with lecture material (lecture notes, educational literature); the information search on a given topic in a scientific literature and electronic sources; doing tests at home; preparation for laboratory works or computer testing; preparation for the exam.

In-class self-study is realized during the laboratory sessions. Foreign students are offered to perform laboratory works individually, which is the study of qualitative or quantitative composition of unknown substances and independent tasks of various levels of complexity.

At their will foreign students can carry out creative independent work, which is to design presentations or performing presentations, for example. They can also participate in scientific conferences and student contests.

Educational guidance by students' self-study is performed in the form of regular consultations with various teaching and methodological approaches.

Note that the most interesting form of self-work on chemical subjects for foreign students are practical activities, such as laboratory works either collective or individual. They seldom perform written papers in corpore. The study of scientific literature in general is a challenge for foreign students because of poor knowledge of Ukrainian and Russian language.

Special attention during the organization of foreign students' self-work at the department of General and Food Chemistry HDUHT is focused on the use of information and communication technologies. Thus, the teachers created informational educational environment full of electronic textbooks, reference books, laboratory works, collections of tasks and tests.

Electronic educational-methodical complex (EEMC) which is placed on the LAN HDUHT and recorded on CDs is developed for the "Chemistry" course. This year "Chemistry" EEMC has been posted online, which significantly increased the content availability. Foreign students were offered to work with EEMC either in "cloud technology" (Box, Dropbox, OneDrive, Google Disk), or in social networks. According to the survey, 80% of foreign students used information from electronic sources during their self-work on the subject.

Quality control of selfstudy on "Chemistry" (module 1. General principles of analytical chemistry) was conducted in the form of individual surveys and test control during laboratory classes and as conversation during consultations.

For current control of knowledge on the subject "Chemistry" (module 1. General principles of analytical chemistry) we developed and implemented into the educational process tests in all themes, each containing 10 "multiple choice" tests and 5 "match making" tests (Fig. 1).

We offer foreign students to self-assess their own level of knowledge through self-testing that includes 4 multiple choice tests, 4 tests to establish the correct sequence, 3 match making tests, and 4 open tests with a short answer while preparing for the exam.

It is worth noting that students who regularly perform all kinds of independent work on the subject using information from electronic sources, showed deep understanding of theoretical material and ability to solve specific problems at the exam.

In V.N. Karazin Kharkiv National University the subject "Medical chemistry" is taught both in Russian and English languages. The course consists of three modules: "General chemistry", "Physical and colloids chemistry", "Organic chemistry". These modules are taught in different departments and differ in their academic volume.

A web-page (<http://www-chemistry.univer.kharkov.ua/>) was created where the presentations of lectures are placed to help foreign students in acquiring material on the subject. Special methodical guidelines in English and Russian languages are issued with the description of laboratory works and theory elements, which help students understand the essence of chemical events and the performed experiments, to solve theoretical problems.

Test for the current knowledge control on "Chemistry"

Module 1. Topic 1.

Variant No. 1

Multiple choice

1. Molar Mass of sulphuric acid H_2SO_4 (g/mol) is:

- a) 98;
- б) 49;
- в) 96;
- г) 78.

2. Specify the number of elements that consists only of the elements of the main group of D.I. Mendeleev periodic system:

- a) F, Cl, I;
- б) Si, Ag, S;
- в) Pb, Ca, Hg;
- г) C, Ti, Pb.

...

Match making

11. Match the equations of chemical reactions with their types:

<i>Equations of chemical reactions</i>	<i>Types of chemical reactions</i>
1) $\text{Na}_2\text{O} + \text{H}_2\text{O} = 2\text{NaOH}$	A) exchange
2) $2\text{H}_2\text{O}_2 = 2\text{H}_2\text{O} + \text{O}_2$	B) adjunction
3) $3\text{KOH} + \text{H}_3\text{PO}_4 = \text{K}_3\text{PO}_4 + 3\text{H}_2\text{O}$	C) polymerisation
4) $\text{Ca} + 2\text{H}_2\text{O} = \text{Ca}(\text{OH})_2 + \text{H}_2$	D) substitution
	E) decomposition

12. Match the classes of inorganic compounds with ions formed during their splitting:

<i>Classes of inorganic compounds</i>	<i>Ions</i>
1) acid	A) $\rightarrow 2\text{Na}^+ + \text{SO}_4^{2-}$
2) salt	B) $\rightarrow \text{K}^+ + \text{OH}^-$
3) base	C) $\rightarrow \text{Na}^+ + \text{HCO}_3^-$
4) acid salt	D) $\rightarrow \text{H}^+ + \text{Cl}^-$
	E) $\rightarrow \text{Ca}^{2+} + \text{OH}^- + \text{Cl}^-$

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Fig. 1. Sample of the test for current knowledge control of foreign students during the study of "Chemistry" in KhSUFT

Medical Chemistry, Module 1.
Test according to the material of seminar No. 1. Card No. 1.

1. For each of the following atoms determine the number of electrons, the number of protons and neutrons in the nucleus:

Atom	Number of electrons	Number of protons	Number of neutrons
${}^4_2\text{He}$			
${}^{24}_{12}\text{Mg}$			

2. Use the periodic table and indicate the group for the elements:

Element	Group			
	Alkali metals	Alkaline earth metals	Halogens	Noble gases
Kr				
Cl				
Ca				
Rb				

3. The electronic configuration of a neutral atom is $1s^2 2s^2 2p^6 3s^2$. Name the element. Write the number of valence *s*- and *p*-electrons of the atom. Is this element metal or nonmetal?

4. Show the electronic configuration of an atom(s) that represents chemical properties similar to magnesium with configuration $1s^2 2s^2 2p^6 3s^2$. Name this element(s).

- (a) $1s^2 2s^2 2p^3$;
- (b) $1s^2 2s^2$;
- (c) $1s^2 2s^2 2p^6 3s^1$;
- (d) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$;
- (e) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2 4s^2$.

5. Determine and indicate the oxidation numbers for the nitrogen atoms in the following molecules and ions:

- (a) NO_3^- : -3 0 +1 +3 +4 +5
- (b) N_2O : -3 0 +1 +3 +4 +5

Fig. 2. The sample of the card for current knowledge control of foreign students during the study of "Medical chemistry" in V.N. Karazin Kharkiv National University

Guidelines for the first module of "General Chemistry" course are based on Ukrainian school course of chemistry which helps foreign students to understand the level and requirements for the initial training in chemistry in high school. Along with the teacher's consultations, these guidelines qualitatively affect the increased knowledge of foreign students on the subject.

Control of foreign students' self-study is carried out during practical classes in the form of recitation and individual written papers (Fig. 2). The results are usually discussed at the next practical class. After the additional individual work on theoretical material foreign students have the opportunity to rewrite written papers.

Conclusions. Thus, modern approaches to the organization of foreign students' self-study in the learning of chemical sciences in Kharkiv State University of Food Technology and Trade and V.N. Karazin Kharkiv National University are revealed in the article.

It is proved that the combination of different types and forms of self-study as well as use of test control improve quality of self-study. It is proved that use of ICT in the organization of foreign students' self-study in chemical subjects enhances the mastering expertise, helps to shape professional and personal qualities of future specialists.

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