

**TEACHING AN ACADEMIC DISCIPLINE
«PHYSICAL CHEMISTRY OF REFRACTORY NON-METALLIC
AND SILICATE MATERIALS» IN ENGLISH USING
THE ELECTRONIC METHODOLOGICAL COMPLEX
IN THE MOODLE SYSTEM**

Distance learning is education; is a system of interaction between teachers and students using a virtual information environment, which provides opportunities for the exchange of various information.

The main advantage of distance learning is that it can be attended by all types of students, including those who cannot enjoy traditional forms of education for objective reasons. Distance learning makes the learning process more creative and personalized, opens up new opportunities for students' creative expression. Experience shows that distance learning students are becoming more independent, mobile and responsible. The main disadvantage of distance learning is the lack of direct personal communication between students and teachers. When nobody else can reflect knowledge in an emotional form, this is an obvious disadvantage of the educational process. In the Republic of Belarus, distance education is a form of education, where education is carried out mainly using modern communication and information technologies. That is not a separate form of education. In fact, an auxiliary tool complements traditional forms of education. However, in the Republic of Belarus, the distance learning encounters the following difficulties:

1) The legal framework is not perfect, that is, the same standards are applied to educational programs implemented using distance learning technologies, so as to traditional ones.

2) The human factor plays one of the most important roles in the establishment and development of innovations. In Belarus, the number of qualified experts is small. University staff cannot, or are unwilling to, put distance education technologies to use. They are thus unable to tap into the potential of distance education

3) The material-technical factor in the system of distance education faces several obstacles. First, there is a lack of investment and state donation in education. Secondly, the lack of qualified specialists makes using new forms and methods of distance education impossible.

4) Most of the population has low incomes and low computer literacy, which restricts the emergence of mass distance learning programs.

5) Conservatism in relation to the distance learning by adherents of conventional education.

In the early 2020, Belarus and the rest of the world faced an unexpected external factor (COVID–2019 pandemic) that triggered a qualitatively new stage in the development of the state, society, economy and education. World medicine turned out to be unprepared to fight the new virus; therefore, the only more or less effective means of preventing the rapid development of the epidemic was self-isolation, i.e. the maximum limitation of contacts between people. An adequate response of the country's education system in this case was the transfer of educational organizations to a remote form of the educational process. The country's higher education system was, for the first time in its history, in a fundamentally new situation, when all educational activities, including education management at all levels, were transferred to a remote format, involving the organization of training using distance learning technologies

The aim of the work is to develop methodical support of distance education in English at the institutions for higher education with a technical speciality within the academic discipline «Physical Chemistry of Refractory Non-Metallic and Silicate Materials» in the MOODLE system.

The academic discipline «Physical Chemistry of Refractory Non-Metallic and Silicate Materials» is recommended at the first stage of higher education for students specializing in 1–48 01 01 «Chemical technology of inorganic substances, materials and products». The discipline is aimed at generating a theoretical knowledge base among students, which is the basis for obtaining forecasting skills in obtaining refractory non-metallic and silicate materials with an adjustable phase composition, given properties and structure.

The electronic methodological complex in English for the discipline «Physical Chemistry of Refractory Non-Metallic and Silicate Materials» was developed in 2021 for part-time students studying in English, but it can also be used to work with foreign students studying in English to improve their academic performance. These teaching materials are available through the Belarusian State Technological University website (<https://dist.belstu.by/course/view.php?id=2427>).

The architecture of the electronic methodological complex has a clear structure and is represented by the following sections: introduction; theoretical section; a practical section; knowledge control section; auxiliary section (Fig. 1).

The introduction has student's work schedule, which contains the schedule of consultations and online lectures; recommendations for the student's work with electronic methodological complex, which describe in detail how to use them; links to the pages of the university, department and library with the information relevant for students; forum for reporting possible technical problems, or making suggestions to improve the course; chat to ask questions the students are interested in.

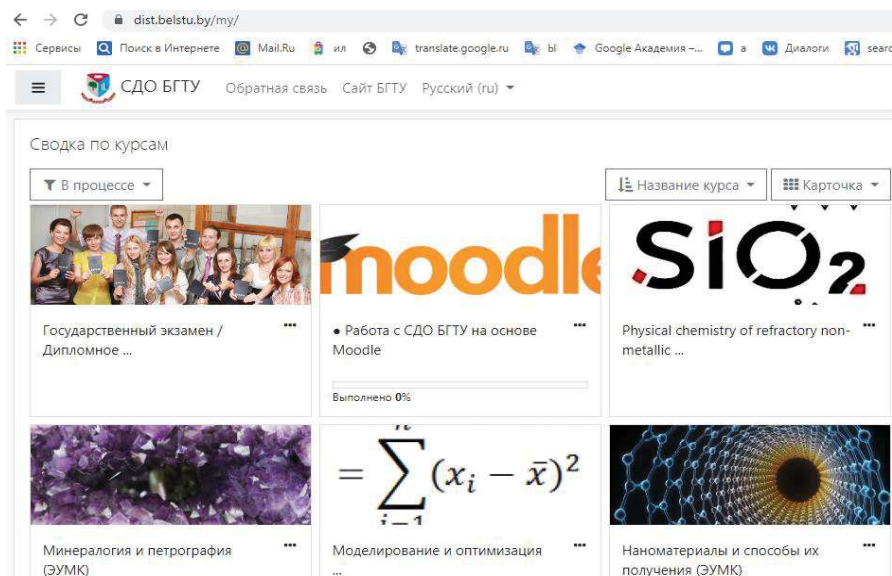


Fig. 1. The view of electronic methodological complex

There is a further theoretical section containing the materials necessary to be prepared for the lectures. There is a link to online lectures. By clicking on this button, the student can join the lecture in accordance with the schedule. The lecture presentations, video lectures and a selection of links to video materials from various Internet resources are available here.

The practical section includes electronic versions of laboratory work; algorithms for calculating liquids curves of two-component systems using the Schroeder-Le Chatelier equation, examples of problem solving, as well as tasks for completing individual tasks.

Recently student testing have become not only the final assessment of students' knowledge, but it is mostly used for the midpoint assessment of knowledge and in the educational process at higher education institutions, which is equally important. In order to improve the learning, online testing presents numerous types of tasks: questions with one correct answer and multiple choice, to match or for sequencing. Nowadays, it is no longer necessary to print out testing forms to do the test. Special platforms for online testing may be used. These services allow creating tests, providing link to any number of students in order to pass a test and generating record of results. Moodle is the platform used for online education and testing. In order to improve the learning, online testing presents numerous types of tasks: questions with one correct answer and multiple choice, to match or for sequencing. There is no need to waste time on manual checking of tests. Immediately after passing online testing, student gets the result of assessment. Teacher, in his/her term, doesn't have to spend a lot of time to check the tests and analyze the results – all happens automatically. Student doesn't have to go or commute somewhere, distract from work and wait for the "verdict", online testing can be passed on mobile phone. Development test-

ing systems contain different types of questions: *Multiple-choice questions* are fundamental survey questions that provide students with multiple answer options. Multiple-choice questions can have single select or multi-select answer options. *True/False questions* is a simple form of a multiple-choice question with just the two choices «True» or «False» and is used to assess a student's ability to determine whether a statement is correct. *Matching* is a test type where students can demonstrate their ability to connect themes; the name of the compound with its formula; the compound and its melting point, etc. Elements are traditionally presented in two columns or lists, and each element in one list is paired with at least one element from the other list. This entry further describes matching items, gives examples of several types of matching items, and discusses issues with scoring certain types of matching items. *A numerical reasoning question* is a question where students are required to answer questions using data presented in lectures or must calculate. *Short-answer questions* are questions that require students to write the right answer without misprint. The answer could be a word or a phrase, but it must match one of your acceptable answers exactly. It is a good idea to keep the required answer as short as possible to avoid missing a correct answer that is phrased differently. These questions students ability to integrate what they have learned in the lectures, practice, and discussions, and to apply that knowledge.

Developed a testing system for spaced assessment of knowledge allows to significantly save time, exclude the subjectivity of the mark and prejudice of the teacher towards students, increase the level of academic performance, disciplines students, and visualize the phenomena and processes by which knowledge is tested.

The auxiliary section contains include: scientific literature databases; a sets of state diagrams for practical exercises; guidelines for teaching an academic discipline; literature recommended by the teacher on the discipline include 30 books; the curriculum on academic discipline for specializing in 1–48 01 01 «Chemical technology of inorganic substances, materials and products»; the main tasks of studying the discipline «Physical chemistry of refractory non-metallic and silicate materials».

The structure of the electronic methodological complex in English for the discipline «Physical Chemistry of Refractory Non-Metallic and Silicate Materials» thus fully meets the requirements of the course in the discipline of the same name and contains all the materials required for its study, and can be used for efficient distance teaching of the discipline according to the following models: fully distance learning (online learning); partial use of distance learning technologies that allow for distance learning (blended learning); web-support training.