

*O.W. Karupu, PhD, T.A. Oleshko, PhD, V.V. Pakhnenko, PhD
(National Aviation University, Ukraine)*

Some actual peculiarities of organization of mathematical training of future aviation specialists

We present some results of our experience of teaching mathematical disciplines in English to foreign and Ukrainian students studying in multinational groups on technical and IT specialties in National Aviation University. We consider the specifics of organization of educational process, especially problems arising in order to organize effective teamwork on practical classes for students which are not native speakers.

For future specialists in the field of aviation the powerful application tools in the study of special disciplines and the solving of applied professional problems are mathematical statements and mathematical methods. Knowledge of the basic theoretical mathematical foundations and possession of the skills of their applying is important for the professional development of future specialists in all IT and technical specialties. Since in NAU most students study in specialties requiring a deep mathematical training, the curricula of these specialties contain various mathematical disciplines.

As for many years most foreign students at NAU studied in purely aviation specialties, from the very beginning of the introduction of teaching in English, most English-speaking groups were formed in these specialties. In recent years, in NAU the number of foreign students studying in Information Technology has significantly increased.

Certain peculiarities of mathematical training arise when teachers work with English-speaking groups, where for the vast majority of students (both Ukrainian and foreign), English is not a native language.

More than ten years authors within the framework of the Higher Education in a Foreign Language Program have been conducting research on the methods of teaching mathematical disciplines in English to foreign and Ukrainian students of NAU. General characteristics of the process of teaching mathematics to foreign and Ukrainian students and specificities of teaching certain mathematical disciplines in English were studied in [1–4] (for more references see [7, 8]). Some aspects of modeling of professional activity of future aviation engineers in teaching of mathematical disciplines in multinational groups were considered in [5]. Peculiarities of using electronic resources in teaching mathematical disciplines were investigated in [6–8]. The implementation of information technology in the study of all subjects opens wide prospects for deepening the theoretical knowledge base, strengthening the applied orientation of learning, opening of creative potential of students. Especially this implementation is desirable for education of students studying in IT specialties.

A certain part of the problems that arise in the teaching of mathematical disciplines to students of English-speaking groups is due to the peculiarities of

mathematical and linguistic training of these students and also arises in the teaching of technical disciplines. The other part of them is specific and arises only when teaching mathematical disciplines to these students.

Analysis of the contingent of foreign students studying at NAU shows that they are representatives of different education systems. Therefore, when teaching mathematics to such students, it is necessary to take into account that English is not a native language for these students and that their education in secondary school was in their native language. It is also necessary to pay attention to the peculiarities of teaching elementary mathematics in secondary schools of the respective countries. In addition, since it is important for Ukrainian students (and for foreign students as well) to have special English terminology, it is also necessary to emphasize certain specifics of the terms.

We also note that certain problems exist with the solving of applied problems. These problems arise as a result of the inability of many students (both foreign and Ukrainian) to formulate a mathematical description of the problem under consideration. In addition, it should be noted that for students of Faculty of Cybersecurity, Computer and Software Engineering, Aerospace Faculty and Faculty of Aeronautics, Electronics and Telecommunications special attention should be paid to the technical problems of the aviation sector, although the training of the vast majority of foreigners in secondary school focused on solving problems related to economics.

It is critical for the vast majority of international students to have reference materials and textbooks in English that contain the necessary theoretical material with a large number of solved examples and the necessary terminology with translation.

In the context of competency-oriented paradigm of education over the past few years, we are implementing a project approach to the organization of educational and scientific work of students. As part of the implementation of project approach, we use collective forms of work in conducting practical classes. The last two academic years this approach to the organization of collective work at practical classes in mathematical disciplines was introduced for English-speaking multinational academic groups of certain specialties of Faculty of Cybersecurity, Computer and Software Engineering, Aerospace Faculty and Faculty of Aeronautics, Electronics and Telecommunications (see [4, 5] and [8]). In our opinion, although the obtained results do not allow making far-reaching generalizations, they are encouraging for further study of this approach.

It should be noted that in the spring of last year all teachers faced new difficulties. Introduction of distance and blended learning has appeared very hard for the first-year students studying in English.

Especially difficult is to organize effective practical classes. Distance learning at NAU during quarantine is conducted in Google Workspace (formerly G Suite) using Google Classroom and Google Meet. The work of student teams on practical classes and consultations, implemented, in particular, with the help of Google Jamboard (see [7, 8]), was generally quite effective. This approach not only helps to increase students' interest in classes, which accelerates their learning, but also develops their teamwork skills, which are very important for aviation

professionals. In our opinion, the obtained results are promising for further application of this approach.

Analysis of our practice of teaching mathematics in English in multinational academic groups gives the opportunity to formulate recommendations for the teacher's work. A detailed algorithmization of the process of solving typical problems and the use of various reference materials is recommended. It is important to pay enough attention to bringing to students the peculiarities of the use of mathematical terminology. In addition, link to aviation issues is very important for student's better understanding of the educational material. We also find it helpful to encourage students to apply CAS and give recommendations for this application.

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