

**IMPROVEMENT OF COOPERATION FORMS
WITH STUDENTS OF CIVIL ENGINEERING TRACK
IN THE ONLINE STUDY OF GRAPHIC DISCIPLINES**

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Engineering graphics is one of the basic disciplines that professional training of students of technical majors is based on from the first year. The studying of graphic disciplines provides students with an opportunity to develop and improve spatial and logical thinking as well as individual graphic skills and to compose and read drawings correctly, etc. Without the knowledge of these factors, it is difficult to imagine competent civil engineers and designers capable of creating new projects of modern machines, buildings, and structures.

Given the difficulties caused by modern socio-economic conditions, as well as due to the quarantine caused by the coronavirus pandemic, starting from March 2020, all educational institutions have switched from traditional (in-person) education to its distanced form of delivery – *online education*. That is, the learning process had to be organized in a way to let students stay home. For the higher education system distance learning is an innovation that requires significant efforts for its practical implementation by both students and teachers, so in the shortest possible time, it was necessary to change and modernize the methods of teaching graphic disciplines. Teaching any discipline for lower-division students has its peculiarities – first-year student need some time to adapt to their new learning system, where they are not just “taught” like in grade school, but are required “to learn” as well. Besides, students need to plan their free time and get used to the new social environment, and, most importantly, from the very beginning, students must clearly understand the purpose and objectives of a discipline, its relationship with their future career, etc. In our opinion, independent work under the guidance of the teacher should certainly play a role in the formation of stable graphic qualities of each student. In other words, additional office-hours consultations, where students are taught to gain and improve skills of independent knowledge acquisition, are required.

Students often face difficulties when studying graphic disciplines for a variety of reasons, one of those being a lack of pre-university graphic training. Such subjects as *Mechanical Drawing* or *Fine Arts Drawing* have been absent in secondary school curricula for more than 10 years. Therefore, in our opinion, to attract those wishing to

major in technical fields, large-scale advertising of OSACEA training courses is needed not only for Mathematics and Ukrainian Language but also for Mechanical Drawing.

Our many years of teaching experience show that those students who have an insufficient level of spatial representation and, in general, graphic skills, immediately start to fall behind. They go through certain difficulties not only in the first year, but also in the further years and are known to have low-quality calculation and graphic works, term papers, and term projects, as well as a poor understanding of special engineering disciplines.

At the Department of Descriptive Geometry and Engineering Graphics of the Odesa State Academy of Civil Engineering and Architecture, for first-year students of civil engineering track, the discipline *Engineering Graphics* (6.5 ECTS credits) consists of two parts. In the 1st semester, the theoretical part "Descriptive Geometry" (120 years) is studied, where the final control is the exam. In the 2nd semester, students consider applied issues of "Engineering and construction drawing" (75 hours), where the final control is a credit.

For several years now, academic disciplines in our Academy have been taught in English, which is a very strong motivating factor for both students and teachers. Generally, in-person classes were bilingual, i.e. the lecturing was of hybrid delivery – in Ukrainian and English.

During the quarantine, we created and experimentally developed a rating system for student performance, which allowed the teacher to perform an objective assessment of current theoretical knowledge *online* using online tests and practical results of graphic work, as well as to bring the given assessment to the attention of students in time. Such indicators reflected the comparative picture in the academic group, helped differentiate individual achievements of each student in a particular topic or task, which was quite interesting and motivated students to improve their graphic training and the results of the final examination.

In conclusion, it is important to note that the application of the differential rating system of a comprehensive assessment of student performance in the educational process, developed by us, creates incentives to increase the intensity of classroom activities and strengthens students' motivation to acquire new knowledge and graphic skills.