AMERICAN JOURNAL OF MULTIDISCIPLINARY BULLETIN
ISSN: 2996-511X (online) | ResearchBib (IF) = 9.512 IMPACT FACTOR
Volume-3| Issue-11| 2025 Published: |30-12-2025|

INFORMATION TECHNOLOGY IN THE PROFESSIONAL TRAINING OF ENGINEERS

https://doi.org/10.5281/zenodo.17890806

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Annotation

Currently, the academic discipline of the general professional cycle is "Descriptive geometry. Engineering and Computer Graphics" is introduced into the training of software engineers in the field of Computer Science and Computer Engineering at the university as a block of graphic disciplines. This discipline is the basis of graphic literacy, which is of particular importance in modern production, equipped with software-controlled machines, robotics and computer-aided design systems.

Keywords

study, discipline, cycle, descriptive geometry, engineer, computer graphics, software engineer, robotics, computer-aided design.

In the context of the development of global information processes, the importance of introducing new information and educational technologies into education is becoming relevant to solve socio-economic problems of society. This poses challenges to higher education related to the development, testing and dissemination of highly effective, innovative educational technologies aimed at increasing accessibility, improving the quality of higher professional education, its effectiveness and competitiveness of graduates of higher education institutions in the labor market. The State Educational Standard of Higher Professional Education establishes requirements for the level of training of certified specialists in the field of Computer Science and Information Systems. The implementation of the list of educational programs (specialties) of the standard within the framework of this area of graduate training provides for the use of information technology mainly for teaching special disciplines and is very limited in the study of general professional disciplines. At the same time, the amount of scientific and technical information that must be mastered by students in the learning process is constantly increasing.

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Necessary for studying a large number of complex academic disciplines using traditional methods. Currently, the academic discipline of the general professional cycle is "Descriptive geometry. Engineering and Computer Graphics" is introduced into the training of software engineers in the field of Computer Science and Information Systems at the university as a block of graphic disciplines. This discipline is the basis of graphic literacy, which is of particular importance in modern production, equipped with software-controlled machines, robotics and computer-aided design systems. Engineers and technicians should be able to read the drawing in order to understand both the design and operation of the depicted product, as well as express their technical thoughts using the drawing. Increasingly, engineers have to deal with drawings and other design documentation presented not on paper, but in electronic form. However, there are clearly not enough engineers capable of such work yet. One of the key requirements for a modern engineer is now the ability to use complex software systems that are installed on high-performance computers and workstations. Thus, there is an increased demand in instrument engineering for engineers with a high level of design graphics training and proficiency in computer graphics systems as a means of solving professional problems. The analysis of scientific, pedagogical and methodological literature suggests that the works close to the topic under study are not comprehensive, and the issues facing computerization of education are not developed in sufficient detail, which makes it difficult to implement them in teaching practice. In these works, the connection of graphic disciplines with the main profiling and related disciplines is poorly seen. Research has shown that the problem of training future software engineers in descriptive geometry, engineering and computer graphics using new information technologies to solve professional problems in the context of widespread computerization of organizations and enterprises seems relevant and economically justified.

The current situation explains the relevance of setting educational goals such as the use of new information technologies in teaching graphics disciplines to computer science and Computer Engineering students at the university and, as a result, improving the quality of their subject training. At the same time, the introduction of a curriculum in descriptive geometry, engineering and computer graphics into the cycle of general professional disciplines for the training of qualified specialists in the field of Computer Science and Computer Engineering is not supported by adequate scientific and methodological support and is mainly implemented systematically, relying on traditional technologies that cannot ensure the effectiveness and required level of training. Thus, there is a contradiction between: - the content of an engineer's professional activity in the field of computer

science and computer technology, which includes setting increasingly complex professional tasks that require the use of new information technologies for their solution, and the content of the educational process at a university, which lacks a component that ensures the formation of an appropriate component of a specialist's professional competence.; - the need for modern approaches and ways to use descriptive geometry, engineering and computer graphics to solve professional problems and the lack of scientific and methodological support for the formation of an appropriate level of graphic training, which in a broad sense includes the goals and content of training, the didactic process, organizational forms of training, teaching tools and other individual components of the pedagogical model of training future software engineers in the field of Computer Science and Computer Engineering at the university.

"Graphic disciplines in the process of training specialists in Computer Science and information Systems at a university" is devoted to determining the place and role of graphic disciplines in the process of training specialists in Computer Science and Computer engineering at a university, analyzing the goals, content and features of teaching graphic disciplines. Taking into account the theory of the interrelation of the components of learning, the main methodological approach of this study is recognized as a holistic, personal-activity approach, in which the educational process is considered taking into account the personal conditioning and personal positions of its participants: teachers and students, that the processes of teaching and learning occur in an active purposeful activity, that the learning outcomes and personality development of students are achieved as a result of the activity. The analysis of the state of graphic training of the future specialist in the field of study at the university revealed changes in the tasks, role and place in the educational process of graphic disciplines. As a result of the study, it was revealed that the study of the course "Descriptive geometry. Engineering and Computer Graphics" allows students to show their qualifying knowledge and skills in performing many types of professional activities, master special academic disciplines, study ways to design various geometric spatial objects, expands their technical horizons and helps them consciously study any technical literature containing drawings and diagrams, develops their spatial and logical thinking, creative engineering imagination. The development of computer technology, programming systems and technical means of displaying graphical information has led to the creation of automated design tools and the execution of electronic drawings. Modern computer graphics tools are simple and easy to use, provide sufficient accuracy, the necessary quality of drawings and ease of making changes to them. Experience shows that personal computers with a well-developed

computer graphics system make it possible to create systems that are suitable for teaching descriptive geometry and engineering graphics at a university. The paper identifies the conditions for the implementation at the current stage of the industry's development of the function of training software engineers in descriptive geometry, engineering and computer graphics at the university.

"Descriptive geometry. Engineering and computer graphics" do not reflect the full implementation of the increased modern industry requirements for a certified specialist in the field of training. In particular, it does not fully reflect the requirements of practice, achievements both in the field of engineering and in the field of pedagogical technologies. Therefore, the content of the training in the discipline "Descriptive geometry. Engineering and Computer graphics" should be built with the diagnostically set goals of studying each educational element through the description of the personality model of a student who has successfully completed his studies in graphic disciplines, with its diagnostically set properties. The content of the training should be complemented by the requirements for the development of creative abilities of the individual in the implementation of modern professional tasks by including missing sections and topics. The structure and content of education, formed according to the hierarchy of educational goals, should be reflected in an electronic textbook (an integral part of an electronic training course), focused on both individualization of learning and traditional methods of teaching graphic disciplines. The formation of skills and consolidation of acquired knowledge should be carried out by performing tasks differentiated by levels of complexity and degree of professional training in practical classes, for which it is necessary to use information technology (professional graphic editor). The study formulates the requirements for the development of an electronic textbook and substantiates the possibility of using hypertext technology in it. The developed requirements for a system of individualized multi-level tasks for practical work have allowed creating conditions for the implementation of a comprehensive technology for teaching graphic disciplines.

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