

**GUIDELINES FOR IMPROVING THE GEOMETRIC TRAINING OF
FUTURE ENGINEERS AT A TECHNICAL UNIVERSITY**

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Annotation. Descriptive geometry explores practical problems, being a means to move from the qualitative study of phenomena to the study of quantitative patterns. Computer technology has taken on many computational responsibilities, but this does not mean that it is not necessary to develop geometric thinking and the ability to apply geometric methods in solving technical problems.

Keywords: descriptive geometry, practice, task, means, study, computer technology, develop, geometric thinking, skill, technical tasks.

An engineer is essentially a creator. Higher technical education should develop in students not only the ability to create an idea, but also to find ways to implement it in practice. Knowledge in universities is acquired for subsequent practice, it should not turn into an unnecessary archive. The enduring value of geometry for practice lies in the fact that it has accumulated a huge store of knowledge, that this knowledge underlies all technical developments, "that it was, is and remains an unsurpassed tool for learning the laws of the surrounding world in terms of flexibility." Descriptive geometry explores practical problems, being a means to move from the qualitative study of phenomena to the study of quantitative patterns. Computer technology has taken on many computational responsibilities, but this does not mean that it is not necessary to develop geometric thinking and the ability to apply geometric methods in solving technical problems. No matter how powerful computing technology is, but without people, it loses its importance.

The need for a fundamental descriptive geometric education of an engineer, in order to "... quickly find a point in complex physical objects that appear to his eyes, to which geometric tools given to him can be applied."

Most authors identify the following educational trends that influence modern technical education: 1) the traditional system of activity was based on a stable system of knowledge, skills and abilities. In modern conditions, when the life span of knowledge has been shortened, knowledge in the traditional sense cannot act as a learning goal; 2) the traditional future was an enlarged or reduced copy of the present. "Today we are preparing the younger generation for life in conditions about which we know little", thus education should lead proactive preparation of the subject for the future; 3) in modern conditions, the role of the ethical concept as determining acceptable solutions is dramatically increasing, reducing the status of pragmatism; 4)

the modern scale of activity is such that each The technical solution irreversibly changes the initial state of the environment, bringing to the fore environmental requirements in the design.; 5) the requirement to respect and develop in every possible way the mind, individuality and personality of a person.

The problems of descriptive geometry training, and in particular geometric training, of future engineers have always been of interest to mathematicians and figures in the field of mathematical education. The pre-presentation of descriptive geometry, and in particular in geometry, related to the need for a critical revision of its initial positions, as well as the completeness and rigor of the proofs. Such a revision in geometry is necessary on the basis of group theory. Geometry has no integrity, plane geometry is presented separately from the geometry of space, excessive formalization of geometry, separation of its methods, content and interpretation from its initially visual essence causes reasonable concern. Studying the issue of teaching applied geometry in technical universities has allowed us to remain relevant to this day: firstly, at present, the teaching of geometry is painfully affected by the burden of tradition, due to which many of its parts, which have lost their viability, are so firmly rooted in it that they are difficult to remove and even make it difficult in every possible way to create new healthy areas; secondly, in teaching geometry in general courses, it is still customary, both at school and at the university, to first present the geometry of the plane, and then the geometry of space completely separately, but unfortunately, the geometry of space is often too curtailed, and the natural ability to spatial intuition is lost; Thirdly, often only practical skills are put in the spotlight, and this is suitable only for secondary technical institutions.; Fourthly, scientists noticed that there is no integrity in the teaching of applied geometry in universities, there are no intra-subject connections between courses in geometry, algebra, and mathematical analysis. At the same time, the author notes "... the absurdities that arise as a result of the isolated position of geometry away from the general development of mathematics." Establishing such principles is perhaps the most difficult task in teaching, noting the substantive and technological difficulties: "Difficulties in teaching any subject arise already when selecting the material to be taught, and perhaps even more so when establishing the principles that should guide learning."

Descriptive geometry and its applications have constantly attracted the attention of scientists. Numerous monographs have appeared in the world literature on various aspects of geometric science, its development, and the relationship of its ideas, methods, and results to practice. From recent works devoted to the relationship of descriptive geometry to knowledge of the surrounding world, to find out the reasons for the applicability of geometric knowledge to engineering problems. To solve technical problems, he notes that: "The widespread use of descriptive geometry to solve a variety of practical problems is a characteristic feature of our time. Where a

qualitative approach has recently prevailed, geometric methods are now being used, and the result is a deeper insight into the processes of nature, technology, economics, and production organization under study." Descriptive geometry education at a technical university, where descriptive geometry knowledge "contributes only to the development of logical thinking, but does not turn into an effective tool for cognition and practical activity...After graduation, young people are psychologically unprepared to clearly see the inextricable link between ideas, results, and methods of theoretical descriptive geometry and their use in practice."

Geometry of higher school preparation: 1) mathematics in higher education institutions plays the role of an auxiliary subject, the study of which is necessary only for understanding special subjects, as well as for the education of logical thinking; 2) special departments do not fully use the available mathematical knowledge of students in engineering, and mathematical departments do not take into account the needs of special departments in training; 3) geometry has been poorly studied and the needs of modern technology in geometric methods and the potential of both old and new ones have been identified. "Sometimes, one can violate the logical integrity of the course of descriptive geometry if special disciplines require the presentation of certain concepts and results earlier than is provided for by the programs and logic of presentation"; 4) the isolation of descriptive geometry geometric methods, regardless of their practical application, descriptive geometric methods live in the minds of students regardless of their upcoming activities; 5) the content of descriptive geometric disciplines is almost the same for all engineering specialties, it does not reflect the relationship of descriptive geometric methods with special engineering disciplines.

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