EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 05, May, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

A BRIEF HISTORY OF DESCRIPTIVE GEOMETRY

Jamilova Dilsuza Tolqin qizi
Samarkand Region, Kattakurgan District,
Secondary School No. 39 Teacher of Fine Arts and Drafting

Abstract
The origin and development of the science of descriptive geometry encompasses several stages and historical periods. Studying this subject in more depth helps us understand how interesting and accessible it is, as well as its interrelation with other sciences.
We will gain knowledge about the introduction and development of descriptive geometry in our country.

Introduction

Descriptive geometry is a branch of general geometry that studies the methods of depicting objects in order to solve positional and metric problems related to their shapes, dimensions, and spatial arrangements. Descriptive geometry is closely linked with mathematical sciences and is considered an applied technical subject. It differs from other branches of geometry by its core method—projection. Using these projection methods, it enhances students' spatial imagination, teaches them how to create drawings and read pre-made diagrams, and assists in solving various engineering problems in practice. Through the laws and rules of descriptive geometry, not only existing objects but also imagined ones can be depicted.
The drawings of spatial shapes on a plane are created using the methods of descriptive geometry based on specific rules and principles. Through these drawings, it is possible to represent the spatial form of an object and determine its dimensions. Using such drawings, stereometric problems related to geometric shapes can be solved. It is impossible to imagine the progress of science and technology without technical drawings. Architects and engineers can fully express their creative ideas only through drawings. All engineering structures are built based on drawings, and machines, machine parts, medical instruments, and so on are produced using them. All known geometric properties of shapes can be identified from the information derived from their drawings. Therefore, the

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 05, May, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

drawings of objects can be referred to as flat geometric models that reflect their geometric characteristics.

The science of descriptive geometry studies the following:

Creating planar representations (drawings) of spatial shapes, that is, their flat models;

Solving geometric problems graphically using flat drawings;

Understanding the spatial positioning and orientation of shapes based on their given flat drawings and creating clear visualizations;

Developing a student's spatial imagination through the construction and interpretation of geometric drawings.

It is known that the properties of geometric shapes can be expressed through both analytical and graphical methods. Based on the graphic model of shapes, their analytical representations can be derived, and vice versa: from their analytical forms, one can construct their graphical drawings. In descriptive geometry, both approaches are used. Depicting designed objects using only graphical methods does not meet the demands of modern production. Therefore, both graphical and analytical methods are used when creating technical drawings.

In recent years, the use of computer graphics tools for preparing technical drawings of objects and the introduction of automated design systems have given descriptive geometry a new meaning and direction in its development.

Descriptive geometry, like other sciences, emerged as a result of human labor and activity. According to the remains of ancient structures, it is known that even before the Common Era, drawings based on visual representations were used. With the development of industry and technical fields, methods of visual depiction also evolved and improved.

During the Renaissance, as architecture and visual arts rapidly developed, knowledge of geometric methods of representation began to emerge in Western Europe. One of the theorists in this field was the Italian scientist Leon Battista Alberti (1404–1472), who in his works "On Painting" and "On Architecture" laid the kinematic foundations of perspective.

A significant advancement in graphical representation methods is associated with the Italian artist, scientist, and engineer Leonardo da Vinci (1452–1519). In his practical work, he expanded the use of perspective images, including the laws of "visual" perspective.

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 05, May, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

The famous German artist Albrecht Dürer (1471–1528), in his manual “Instruction in Measurement”, presented several methods for drawing plane and spatial curves. He created a new, distinctive method of perspective drawing known as the “Dürer method.”

The Italian scientist Guido Ubaldo (1545–1607) laid the foundation for determining actual dimensions using perspective.

The French mathematician Girard Desargues (1593–1662), in his work “A General Method of Depicting Objects in Perspective,” made a significant contribution to descriptive geometry by applying the coordinate method to perspective drawings.

The German geometer Johann Heinrich Lambert (1723–1777) recommended solving problems in elementary geometry graphically using the methods of perspective drawing.

Thus, by the end of the 18th century, substantial experience had been accumulated in projection methods.

However, these methods remained scattered and had not yet been unified into a coherent theory. The French geometer Gaspard Monge (1746–1818) summarized and systematized existing knowledge in the field of graphical representation in his work "Géométrie Descriptive" ("Descriptive Geometry"). Through this, he laid the foundations of descriptive geometry as a scientific discipline.In Russia, descriptive geometry began to be taught in 1810 at the Saint Petersburg Institute of the Corps of Engineers (now the Saint Petersburg State Transport University) in French. To teach the subject, Monge’s student K. Pote was invited. Later, his assistant Ya. A. Sevastyanov (1796–1846) began delivering lectures on descriptive geometry in Russian. In 1821, he published the course “Fundamentals of Descriptive Geometry,” which was the first original textbook in Russian and at the time surpassed many European books on the subject in quality.In 1824, Sevastyanov became the first Russian professor in this field. The work of Professor V. I. Kurdyumov (1853–1904) stood out for its theoretical depth and scientific consistency. From 1886 to 1919, he introduced new approaches to methods of depiction, and his ideas on vector-based descriptive geometry still retain scientific significance today. In his works, such as “New Geometry as the Basis of Technical Drawing” and “New Descriptive Geometry,” he employed numerical vectors. Doctor of Technical Sciences and Professor N. A. Rynin (1877–1943) authored numerous scientific works in the field of representation methods. In addition to his

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 05, May, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

well-known textbooks covering all sections of the field—"Descriptive Geometry," "Axonometry," "Projections Defined by Numbers," "Projection," and "Elements of Linear Perspective"—he also conducted many research-oriented studies. D. I. Kargin (1880–1949) made significant contributions to descriptive geometry and engineering graphics. He conducted scientific work on improving the precision of graphical computations and constructions. Kargin was the first person to earn a doctoral degree in graphics. Professor M. Y. Gromov (1884–1963) focused his research primarily on developing the theory of the formation of curves and surfaces. He was among the first in the former Soviet Union to defend a doctoral dissertation on the topic "Kinematic Foundations of Curves and Surfaces in Descriptive Geometry." From 1935 to 1941, M. Y. Gromov headed the Department of Descriptive Geometry and Drawing at the Tashkent Institute of Textile and New Industries. During this time, he advanced his scientific and methodological work and, in 1937, created the educational manual "Problem Collection on Projection Drawing." From 1941 to 1945, the scientist lectured at what is now the Tashkent Institute of Irrigation and Architecture. Doctor of Physical and Mathematical Sciences, Professor N. F. Chetverukhin (1891–1947) was one of the most renowned experts in engineering graphics during the Soviet era and served as the chairman of the expert committee on composition. His work "Theory of Conditional Representation" made a significant contribution to the theory of graphical representation. In addition, he authored the textbook "Methods of Geometric Constructions." Professor V. O. Gordan (1892–1971) was a leading specialist in teaching descriptive geometry and engineering graphics. His drawing textbook for general education schools served as a vital resource for millions of students over many years. From 1941 to 1945, Gordan led the Department of Descriptive Geometry and Drawing at the Tashkent Textile and Light Industry Institute. During this period, he completed the writing of his book "Descriptive Geometry Course." Today, this book has been published many times and is considered a classic core textbook for technical universities in Russia. Doctor of Technical Sciences, Professor A. I. Dobryakov (1895–1947) wrote the comprehensive textbook "Descriptive Geometry Courses," which was specifically designed for architecture and construction specialties in higher education. His "Problem Collection in Descriptive Geometry" serves as a logical continuation of that book. Dobryakov

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 05, May, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

also developed key aspects of the theory of perspective and shadows, formulating new theorems as a result.

The Development of Descriptive Geometry in Central Asia In Central Asia, early references to descriptive geometry can be found in the 9th to 11th centuries in the works of encyclopedic scholars such as Muhammad al-Khwarizmi (789–850) and Abu Ali ibn Sina (980–1037), particularly in texts on “Geometry,” “Geodesy,” and “Astronomy.” During the Timurid era, majestic buildings, mosques, and madrasas were erected throughout the Movarounnahr region. These structures were certainly constructed based on precise drawings, which, according to numerous records, were created using special drawing instruments. Professor S. M. Kolotovich (1885–1965) holds a special place in the development of methods of graphical representation. From 1926 to 1944, this Ukrainian scientist worked in various organizations across Uzbekistan, including at the Department of Descriptive Geometry and Architectural Design at the Central Asian Industrial Institute. In 1933, he published the book “Course in Descriptive Geometry.” The history of descriptive geometry in Uzbekistan is closely linked to the activities of the Turkestan People's University (now the National University of Uzbekistan). In 1930-1934, several higher technical educational institutions were separated from the University, and "Descriptive Geometry and Drawing Departments" were established and began to be taught. In the early years, great attention was given to developing teaching methodologies, preparing drawing sets (assignments) for students, and enhancing the pedagogical skills of young teachers.

The first educator in Uzbekistan in the field of descriptive geometry was Rakhim Khoreunov (1911-1992), who defended his candidate's dissertation on the topic "Some Issues of Visual Representation in Parallel Projection" in Leningrad in 1953. From 1953 to 1983, he served as the head of the department at the Tashkent Institute of Railway Transport and created his own scientific school, supervising several candidate theses. In 1961, Rakhim Khoreunov published a textbook titled "Course on Descriptive Geometry," which led to the development of a terminological system for descriptive geometry in the Uzbek language. Subsequent editions of the textbook included all sections defined by the subject’s standard program and were prepared specifically for architecture and construction specialists. In 1966, Khoreunov was awarded the title of professor, and in 1981, he was honored with the title of Honored Scientist of Uzbekistan. Yusuf Qirg'izboev (1912-1995)

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 05, May, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

worked as the head of the department at the Tashkent Textile and Light Industry Institute from 1951 to 1978. In 1958, he published the first textbook on descriptive geometry in Uzbek for mechanical engineering specialties. The book created a system of Uzbek terminology for the methods of representation used. In 1961, Yusuf Qirg'izboev was awarded the title of associate professor. In 1974, together with E. Sobirov, L. Hakimov, and I. Rakhimov, he co-authored the textbook "Course on Mechanical Engineering Drawing," which was the first work in Uzbek to be published on the subject. This book developed not only theoretical and practical knowledge but also a system of drawing terminology. Starting from 1963, Sh. K. Muradov, one of the republic's pedagogues, was the first to enter the postgraduate program under the scientific school of Professor S. M. Kolotov in Kiev. This led to scientific collaboration between Ukrainian and Uzbek scientists. In the 1960s, V. E. Mikhayilenko, the head of the Kiev scientific school and a Doctor of Technical Sciences, gave lectures at higher educational institutions in Bukhara and Samarkand. Later, he visited cities such as Tashkent, Bukhara, Urgench, Chimkent, and Jambul, conducting scientific seminars, selecting researchers and postgraduate students, which contributed significantly to the development of the subject in Uzbekistan and neighboring republics. Currently, 23 out of 26 Ph.D. holders working in the republic have defended their dissertations in this scientific school, with three of them being professors (Sh. K. Muradov, J. Ya. Yodgorov) and one holding the title of Doctor of Science (D. F. Quchqorov).

CONCLUSION

In this article, we have discussed the origin and development of the subject of descriptive geometry, as well as the theories of local and foreign scientists. This, therefore, serves as one of the key foundational programs for us, future specialists.

REFERENCES

1. Constitution of the Republic of Uzbekistan. Tashkent, Uzbekistan, 1993.
2. The Law of the Republic of Uzbekistan on "Education" and the National Program for Training Personnel, T. 29 August 1997.
3. Murodov Sh., Hakimov L., Odilov P., Shomurodov A., Jumaev M. "Course on Descriptive Geometry." Tashkent: O'qituvchi, 1988.

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 05, May, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

4. Shermuxamedova N. A. "Scientific Research Methodology." Tashkent: "Innovation-Ziyo", 2020.
5. Rixsiboyev T. "Computer Graphics." Uzbekistan Writers Union Publishing House, Tashkent, 2006.
6. Sabirova D. U., Alimova D. K., Mirzaraimova V. T. "Descriptive Geometry and Computer Graphics" Educational-Methodological Collection. Tashkent: TDTU, 2016.
7.Shermuxamedova N. A. "Scientific Research Methodology." Tashkent: "Innovation-Ziyo", 2020.
8. William Griswold Smith. "Practical Descriptive Geometry." London, 2013.
9. http://www.ziyonet.uz
10. http://www.wikipedia.org