



GRAPHIC GEOMETRY ON THE BASIS OF GRAPHIC REPRESENTATION

**Botayev Akhmadali Ashurovich,
Ergasheva Orifaxon Kholmurodovna**

Teachers of Kokand State
Pedagogical Institute

Article history:	Abstract:
Received: October 30 th 2020 Accepted: November 11 th 2020 Published: November 30 th 2020	This textbook gives theoretical fundamentals of drawing geometry, projection methods, orthogonal projections of point and straight line, planes, plane and straight line, two planes, transformation methods of axonometrical projections, basic words, algorithms of problem solution, variants of tests.
Keywords: Drawing geometry, graphical solution, Leon Alberti, New geometry, Kargin, Descriptive Geometry, Rakhim Khorunov, AutoCad	

Drawing geometry is a branch of general geometry that studies the solution of positional and metric problems related to the shapes, sizes, and relative positions of objects using methods of representation. Descriptive geometry is inextricably linked with the mathematical sciences and is one of the general technical sciences. Drawing geometry differs from other geometries in its basic method, i.e. the method of representation. It expands the student's spatial imagination through imaging techniques, helping to create images and read pre-made images, as well as solve various engineering problems in practice. With the laws of descriptive geometry, it is possible to describe not only what exists, but also what can be imagined. Plane drawings of shapes in space are created by the methods of descriptive geometry according to certain rules. Through these drawings it is possible to draw the spatial shape of the object and determine its dimensions. With the help of drawings, stereometric problems related to geometric shapes are solved. It is impossible to imagine the development of science and technology without drawings. Architects and engineers can fully express their creative ideas using only drawings. Based on the drawings, all engineering structures are built, machines, machine parts, medical devices, etc. are produced. All the geometric properties of shapes known to us can also be determined from the data obtained from their drawings. Therefore, the drawings of objects can be called flat geometric models that reflect their geometric properties. The science of descriptive geometry studies:

- graphical solution of geometric problems in a flat drawing;
- visualize their spatial attempt and 12 positions on the given flat drawings of shapes and make vivid images;
- develop the student's spatial imagination by making and reading drawings of geometric shapes.

It is known that the properties of a geometric shape can be examined analytically and graphically. According to the graphical model of shapes, their representation in an analytical way and, conversely, the methods of making their drawings from the analytical view of shapes can also be seen in graphic geometry. The graphic representation of the projected products only does not meet the requirements of modern production. Therefore, in addition to graphical methods, analytical methods are used in drawing graphs. In recent years, the introduction of automated design systems in the preparation of drawings of objects using computer graphics has acquired a new meaning in the development of the science of descriptive geometry.

Graphic geometry, like other sciences, came into being as a result of human labor. It is known from the remains of ancient buildings that drawings made on the basis of images were used even in BC. With the development of the canoe and technology industries, image-making techniques have also improved. During the Renaissance, as a result of the rapid development of architecture and fine arts, in Western Europe began to emerge information about the methods of depiction on a geometric basis. One of the theoreticians in this field was the Italian scientist Leon Alberti (1404-1472), who in his works "On Art" and "On Architecture" developed the cinematic basis of perspective. The development of graphic methods is associated with the name of the Italian artist, scientist and engineer Leonardo Da Vinci (1452-1519). In his practical work, he expanded the scope of application of the laws of perspective images, including the perspective of "observation". The famous German artist Albrecht Dürer (1471-1528) in his work "Guide" gave several ways to create straight and spatial curves. He created a new unique method of perspective construction called the Durer method. Italian scientist Guido Ubald's (1545-1607) "The basic slogan for determining the true dimensions of perspective." The French mathematician Girard Desargue (1593-1662) made a significant contribution to the science of descriptive geometry by using the coordinate method from perspective construction in his book The General Method of Describing Objects in Perspective. German geometry Lambert (1723-1777) proposed

to solve the problems of element geometry in a graphical way on the basis of perspective construction. Thus, by the end of the XVIII century, sufficient experience in the methods of projection was accumulated.

However, these methods were scattered and not integrated into a single theory. French geometry Gaspar Monge (1746-1818) summarized and systematized his knowledge in the field of descriptive methods in his 14 works "Descriptive Geometry" ("Descriptive Geometry"). He thus laid the foundations of graphic geometry as a science. In Russia, descriptive geometry began to be taught in French in 1810 at the St. Petersburg Institute of Engineers (now the St. Petersburg Institute of Railway Transport). K.Pote, a student of Gaspar Monj, was invited to teach science. Later, Pot's assistant, Ya. A Pote was offered. Later, Pot's assistant, Ya. A. Sevfstiyarov (1796-1846) began to read data on descriptive geometry in Russian. In 1821, he published a course, Fundamentals of Descriptive Geometry. This was the first original textbook in Russian, which at the time was far superior to books written on the subject in Europe. Yes. A. Sevfstiyarov was awarded the title of the first professor in 1824. The works of Professor VI Kurdyumov (1853-1904) are distinguished by their theoretical depth and consistency of scientific foundations. He advanced his new views on imaging methods in 1886-1919. His ideas on vector drawing geometry have not lost their scientific significance. The scientist used number vectors in his works, such as "New geometry as the basis of drawing", "New descriptive geometry". Doctor of Technical Sciences, Professor N.A. Rinin (1877-1943) is the author of many scientific works in the field of imaging methods. In addition to such well-known lectures as "Drawing Geometry", "Axonometry", "Numerical Projections", "Projection", "Elements of Linear Perspective", which cover all sections of science, he is known for many research works. D. I. Kargin (1880-1949) was a scientist who made a great contribution to the science of descriptive geometry and engineering graphics, and carried out scientific work on the precise calculation and construction of the graph. D. I. Kargin is the first doctor of science in graphics. Professor M.Y. The main direction of Gromov's (1884-1963) scientific work was to enrich the theory of the formation of curves and surfaces. He was one of the first from the former Soviet Union to defend his doctoral dissertation on "15 kinematic bases of curves and surfaces in descriptive geometry". In 1935-1941, M.Y. Gromov headed the department of "Descriptive Geometry and Drawing" of the Tashkent Institute of Textile and New Industry.

During this period he developed his scientific and methodological work, and in 1937 created a textbook "Collection of problems on projection drawing." In 1941-1945, the scientist lectured at the present-day Tashkent Institute of Irrigation and Architecture. Doctor of Physical and Mathematical Sciences, Professor N.F. Chetverukhin (1891-1947) was the chairman of the most famous expert composition of engineering graphics of the Soviet era. N.F. Chetverukhin's Theory of Conditional Imaging was a major contribution to descriptive theory. He is also the author of textbooks entitled "Methods of geometric construction." Professor VOGordan (1892-1971) was a leading specialist in teaching graphic geometry and engineering graphics, and his drawing textbook for secondary schools for several years served as a necessary guide for millions of students. from In 1941-1945 Gordan headed the department of "Descriptive Geometry and Drawing" of the Tashkent Institute of Textile and Light Industry. During these years he completed the book "Drawing Geometry Course". To date, the book has been published 24 times and is the main classic textbook for Russian universities. Doctor of Technical Sciences, Professor A.I. Dobryakov's (1895-1947) "Drawing Geometric Courses" is a very comprehensive textbook for universities specializing in architecture. The scientist's "Collection of problems of descriptive geometry" is a logical continuation of this book. AIDobryakov developed the most important problems of perspective and shadow theory, as a result of which he described new theorems. 16 1.2. Development of the science of descriptive geometry in Central Asia. The first information about descriptive geometry in Central Asia was given by encyclopedic scholars Muhammad al-Khwarizmi (789-850), Abu Ali ibn Sino (980-1037) and others who lived in the IX-XI centuries. During the reign of Timurid, such as "Astronomy", magnificent buildings, mosques and madrasas were erected in the territory of Movarounnahp. The buildings, of course, are based on clear drawings. There is a lot of information that the drawings were made with the help of special drawing tools. Professor SM Kolotovitch's (1885-1965) services in the development of imaging methods have a special place.

From 1926 to 1944, the Ukrainian scientist worked in various organizations of Uzbekistan and the Central Asian Industrial Institute, Department of Descriptive Geometry and Architectural Design, and in 1933 published a course on Descriptive Geometry. The history of descriptive geometry in Uzbekistan is connected with the activity of Turkestan People's University (now the National University of Uzbekistan). In 1930-1934, a number of higher technical schools were separated from the University, where the departments of "Descriptive Geometry and Drawing" were established and began to teach. In the early years, great attention was paid to the methodology of teaching the subject, the creation of collections of drawings (assignments) performed by students and the improvement of pedagogical skills of young teachers. Rakhim Khorunov (1911-1992), the first teacher of descriptive geometry in Uzbekistan, in 1953 R. Khorunov defended his dissertation in Leningrad on "Some problems of creating a clear image in parallel projection." From 1953 to 1983 he was the head of the department at the Tashkent Institute of Railway Transport, established his own scientific school, supervised several PhD theses. In 1961, R. Khorunov published a textbook on "Course of Descriptive Geometry", which led to the creation of a set of terminology of the science of descriptive geometry in the Uzbek language. Subsequent editions of the textbook include all 17 sections with a standard program of science, which is designed for architectural and construction specialists. In 1966, R.Khorunov was awarded the title of professor, in 1981, the title of Honored Scientist of Uzbekistan.

General information about AutoCAD.

There are many types of computer graphics programs available today that vary in their applications. Experts in each field choose a graphics program that is convenient for their work. The scope of the program will also be area-specific. So, when choosing a graphics program, you must first take into account its capabilities. In most cases, you will need to learn another program or science before using a graphics program. This makes graphics programs more complex.

AutoCAD is an automated design package from Autodesk in the United States that allows you to perform high-quality computer modeling and design work, allow the user to quickly and efficiently develop technical drawings, high-precision, and simultaneously print on paper.

AutoCAD was created in 1982 and was originally designed for MS DOS only. Since 2000, design programs based on the automation of graphic creation have been perfectly developed, and now Autodesk is developing AutoCAD for Microsoft Windows only. What is meant by automation of design work? First of all, it is understood that graphic creation is performed automatically based on the capabilities of graphics programs. The interface of the modern AutoCAD (Auto Computer-Aided Design) system is designed taking into account the capabilities of the most modern computer tools and technologies, which ensures high quality execution of drawings and diagrams, design tasks. Although AutoCAD has been around for over 25 years, it is still one of the leading automated design programs. Because AutoCAD is a perfect and popular program, it can create all kinds of schemes and drawings with high accuracy and quality. It also helps users to realize their full potential. Therefore, the use of AutoCAD in the field of automation of design work by millions of professionals, scientists, engineers and students is becoming increasingly popular.

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