

**PECULIARITIES OF DESCRIPTIVE GEOMETRY TEACHING
TO FIRST- AND SECOND-YEAR STUDENTS UNDER MODERN CONDITIONS**

NATALIA PAULAVA, DZYANIS HLUSCHUK
Vitebsk state university named after P.M. Masherov, Belarus

Descriptive geometry is one of the main graphic disciplines. Parts of the course of descriptive geometry, their interconnection in the discipline are described within the contents of the named course. A methodological component determines a set of teaching and training materials required for a better process of descriptive geometry teaching. Computer graphics modeling, in turn, makes an integral part of the named discipline teaching process.

Descriptive geometry, as it was said, is one of the main graphic disciplines. It influences the development of spatial and logical thinking, graphic culture of students, i.e. understanding of rules and principles and ability to draw and model graphical objects. It contains, as many other graphic disciplines, great possibilities for further development of students' creative activity.

Meanwhile the course of descriptive geometry is successfully taught at construction, engineering, mechanical engineering faculties, as well as faculties of arts and drawing at universities.

According to the systematic curriculum of the study program "Fine Arts, Drawing and Folk Arts and Crafts", the course of descriptive geometry within the discipline "Drawing and Technical Drawing" is studied by first- and second-year students of Art and Graphics Faculty at Vitebsk State University named after P.M. Masherov during the first term, i.e. as soon as school-leavers become university students.

A certain problem of the lack of time for graphic disciplines teaching appears in this connection. It is also important to take into account a relatively low level of first- and second-year students' spatial thinking and theoretical ground. Student's desire for self-education leaves much to be desired as well. It is not equally true for all students, but the fact remains [1].

As L.P. Rusinova states in her work "a first-year student, beginning a systematic study of descriptive geometry, should develop his spatial thinking, spatial imagination and systematic-and-spatial thinking. The very notion 'spatial imagination' means one's ability to clearly imagine 3D objects with all their details and in all colours" [3].

Thus we can claim that the development of spatial thinking is a rather important process for students of almost any study program – artistic, pedagogic, engineering, etc.

The aim of the research is to determine content and methodological components of the course of descriptive geometry for students of the study program "Fine Arts, Drawing and Folk Arts and Crafts".

Parts of the course, their interconnection with the content and structure of the discipline descriptive geometry are determined within the content component.

Sections of descriptive geometry are united into a logical system, based on a theoretical ground. It is observed in a strong and continuous interconnection and interdependence of a further material with the previous one.

Still, as O.V. Yaroshevich notices, the content of the course has a character of a sustainable system, based on the principles of succession and simplicity of material presentation. Such a system was developed in the XVIII century by a French scientist G. Monge. Different authors tried to develop their own understanding of the course structure. Among the authors we can find the names of T.Y. Artemova, V.N. Vinogradov, A.A. Chekmarev, L.S. Shabeka, A.M. Shvaiger. Nonetheless the content of the course remains almost the same and contains following sections:

- introduction;
- methods of projection;
- point; straight line;
- plane;
- relationship of a point, straight line and plane;
- conversion methods of drawing;
- polyhedrons;

- curved lines and surfaces;
- intersection of the surface with a plane and a straight line;
- mutual intersection of surfaces;
- scan [4].

A similar structure of the course of descriptive geometry is fixed in the systematic curriculum of the discipline "Drawing and descriptive geometry" [2]. Taking into account that students begin the course of descriptive geometry in the first semester, it is important to study means and ways of drawing, the rules of drawing according to the existed standards.

A methodological component determines sets of teaching and training materials (methodological guidelines, illustrated materials, computer models, sets of tasks, etc.) to provide the teaching process of descriptive geometry.

According to the systematic curriculum, mastering of the course includes lectures, lab works and students' self-education.

During lab works students solve geometric and graphical tasks using drawing instruments. Students learn ways of solving positional and metric tasks in all sections of descriptive geometry. They also have to write two tests. The first test checks the level of students' knowledge in the field of point, straight line and plane drawing, their geometric relationship, and ways of the drawing transformation. The second test includes tasks in drawing of polyhedrons, surfaces of revolution and intersection of the named bodies with a plane and a straight line.

For effective self-education a workbook on descriptive geometry is worked out. Due to a specific character of the discipline, various graphical tasks make the main material, the tasks are done by the students during lab works or independently. Presentation of the material is specially emphasized by means of schemes and tables.

A set of teaching and training materials was worked out to provide the course of descriptive geometry. The set of materials includes lectures, tasks for lab works, tasks for self-study, etc. A set of 3D computer models is also worked out for a better mastering of the theme "Polyhedrons and Surfaces of Rotation" and widely used at lectures. Teaching experience proves that having studied simple geometric elements – point, straight line and plane – building and projection of surfaces cause sufficient problems at the beginning of the course.

Meeting modern tendencies in higher education, the access to theoretical materials is possible by means of a virtual distance learning system Moodle in Internet. Students can also find here materials to prepare for tests. It also should be mentioned that on-line counselling is becoming more and more popular among students and teachers [1].

Thus, within the determination of components of the course descriptive geometry it was concluded that the named course should include a system of lectures and lab works. An integral part of it should belong to computer and graphic modelling in the process of teaching.

A system of teaching and training material was worked out to meet the needs of the course: e-lectures, geometric and graphical tasks for lab works, tests, sets for computer modelling studies in descriptive geometry, such materials as training models and materials for self-study.

Research results prove that introduction of such materials improves the mastering of descriptive geometry, influences the introduction of modern tendencies in organization of the teaching process. All these influence the becoming of a specialist adequate to modern requirements of science and technology.

REFERENCES

1. Глушук, Д.П. Компьютерно-графическое моделирование как средство совершенствования подготовки студентов по начертательной геометрии / Д.П. Глушук // Искусство и культура. – 2016. – № 1. – С. 117–121.
2. Образовательный стандарт высшего образования. Высшее образование. Первая ступень. Специальность 1-03 01 06 Изобразительное искусство, черчение и народные художественные промыслы. Квалификация: Педагог-художник. Преподаватель: ОСВО 1-03 01 06-2013 : утв. и введ. в действие постановлением М-ва образования РБ от 30.08.2013 г. № 87 / разработ.: УО «Белорусский государственный педагогический университет имени М. Танка». – Введ. 2013-08-30. – Минск : М-во образования Респ. Беларусь, 2013.
3. Русинова, Л.П. Развитие пространственного мышления у студентов в начале изучения курса «Начертательная геометрия» / Л.П. Русинова // Молодой ученый. – 2012. – № 3. – С. 391–394.
4. Ярошевич, О.В. Методическая система формирования культуры умственного труда студентов при обучении начертательной геометрии : автореф. дис. ... канд. пед. наук : 13.00.02 / О.В. Ярошевич ; Белорус. гос. пед. ун-т им. М.Танка. – Минск, 2001. – 22 с.