

**METHODOLOGY OF USING AutoCAD SOFTWARE IN DEVELOPING TECHNICAL
CREATIVITY OF STUDENTS**

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ANNOTATION

The role of AutoCAD in the development of technical creativity of students in the teaching of special subjects is very important. This article discusses the role and importance of graphics programs in the design and modeling of objects in the field of technical creativity and design.

Keywords: Computer, AutoCAD, 3DMax, model, "Designer clothing", "Designer clothing".

INTRODUCTION

Computer graphics have been around for many years, and even in the 1960s, full-fledged graphics systems were available. The terms computer graphics (CG) and computer animation (CA) are currently used. While the concept of computer graphics encompasses all aspects of working with static images, computer animation works with dynamically variable images. Computer graphics is the process of inserting, outputting, displaying, modifying, and editing graphic objects in computer control.

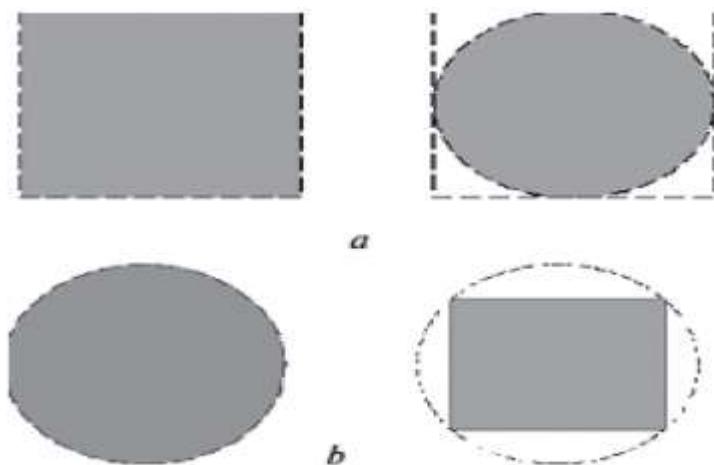
Computer animation is a synthesis of dynamic images on a computer, "animating" images on the screen. Computer graphics is a special branch of computer science that studies the methods and tools for creating and processing images using software and hardware computing systems. The field that studies how to create three-dimensional objects in virtual space is called three-dimensional (3D) graphics. It usually uses vector and raster methods of image creation.

General concepts of computer graphics Computer graphics are divided into 3 types depending on the methods of image formation.

1. Raster graphics.
2. Vector graphics.
3. Fractal graphics.

They differ from each other in the technology of production and processing of visual information. The concept of raster graphics. In raster graphics, objects are represented using colored dots (pixels) on a grid on a bit map. We use raster editors to work with raster images. Raster images

differ from other formats in that the page format of the document on the raster screen is rectangular. If you want to change the page format, you can use Property Bar. If you select a book (Portrait), it will page across the document, and if you select Landscape, it will page across the document. The size of the above pages should not be confused with the printable size.



1-picture. Rastrian objects of different shapes

In a rastrian graph, any image will be composed of dots-pixels. Each pixel will have a different color. They constitute a holistic image while the complex. The user will have the opportunity to process each pixel, the more the number of pixels in the image, the higher the quality of the image. In rastrian computer graphics, great attention should be paid to the color system. In the graphics, mainly RGB (Red, Green, Blue) and CMYK (Cyan, Magenta, Yellow, black) color systems are used. RGB and system is used for images that are displayed on the screen (for example, on a web page), CMYK color system is used mainly for images that are printed.

Programs for working with raster graphics allow you to perform several tasks:

- Change color system;
- Print;
- Save with another name and extension;
- Apply different effects.

Currently, there are simple and complex raster graphics editing programs. One of the simplest graphic editors is the Paint program, which is part of the Windows operating system. This program allows you to perform simple actions, but in order to take advantage of professional-level capabilities, it will be necessary to use special raster graphics programs: Adobe Photoshop, Corel Photoshop, Adobe Flash and so on.

Adobe Photoshop software is currently the most popular and recognized program by experts from all over the world.

The concept of vector graphics vector graphics is that vector graphics perform actions on mathematical objects without links to external devices (monitors, printers). In vector graphics, first of all, the shape of the object changes, while the color becomes secondary. The reason is that in vector graphics, the shape with the color is not interrelated, the shape is the first level, and the color is the second level. In vector graphics, the images will be composed of geometric shapes. A set of lines and shapes creates a general picture or image of something as a result.

One of the advantages of vector graphics is that - no matter how large the image scale, its quality also does not change the range. The computer performs all calculations on the basis of mathematical formulas for image formation in vector graphics. In vector graphics programs, new images are created, but at the same time it is possible to add Rast images to them. The possibility of editing imported, that is, inserted Rast images is not foreseen in vector graphics programs.

Vector graphics programs are produced by several companies, and some of their capabilities are included in the scope of the functions of some programs. For example, in the Word program, which is included in the set of MS Office programs, it is possible to draw some vector forms and include them in the composition of the document.

To make perfect use of vector graphics capabilities, it is desirable to use special programs, for example: Corel Draw, Macromedia FreeHand, Adobe Illustrator, etc. Of the above programs, the most popular and widely used, this is of course the Corel Draw program. Currently, it has 11-and 12-versions. Corel Draw software allows you to create an image of someone using the tools and shapes available in it, apply various effects to it, import Rast images, print or export the finished image.

The images formed by the Fractal graphics tool are also based on mathematical calculations, just like vector graphics. But it differs from it in that it does not store any obyekt in computer memory. The image is built on the equation (or system of equations). Therefore, it is not necessary to store anything other than formulas.

The term fractal is derived from the Latin word *Fractus*, which means "made up of parts". French mathematician Benue Mandelbrot published in 1975 the book "the fractal geometry of Nature", and Fractal Su became one of the most common terms. As the simplest fractal obyekt it is possible to bring snowflakes or a daisy leaf. Therefore, the Fractal obyekt is formed not on the basis of drawing or finishing, but on the basis of programming. In various games organized on the PC, too, the Fractal graphics are foddal. Fractal graflka is not stored in computer memory. Each image is built on the basis of a system of equations or equations. It is possible to form a completely different image by changing the coefficient of an equation in a fractal graph. A number of software tools have been developed to organize and manage the listed types of computer graphics. Computer graphics and animation programs are of great interest to artists and designers, polygraphists and cinematographers, creators of computer games and training programs, klipmeyer and scientists, as well as all specialists who use images of various formats in their activities.

For 2020-th year, the following graphic design programs have been recognized as the best. Adobe Photoshop graphic designer software is considered a program that offers excellent graphic design capabilities and is constantly working on delivering a more streamlined user interface. Graphics that include Adobe web motion, 3D, are improving painting schemes.

In the CorelDraw Graphics Program, we can see the proportions of the desktop, the dimensions of the icons, the toolbox, the options for how to open your documents, and the colors. It is distinguished by the fact that it exports up to 48 file types and opens its files, including AutoCAD, JPG, PNG,SVG, and TIIF.

Gravit AutoCAD is an HTML based graphic design application for delivering high-quality vector graphics. It is considered one of the best applications for graphics, product or web designers and can easily manage the control panel.

Modeling is two-dimensional and three-dimensional (2D and 3D). Two-dimensional and three-dimensional modeling applications come hand in hand for design and engineering developments. Apart from these, these programs can be supplemented with three-dimensional animation, printing, presentation packages. Within the modeling software, it is possible to obtain AutoCad software from the company Autodesk, as the most powerful automated design system used in the Windows environment. They usually take AutoCad as the graphics core of an automated drafting system. With the help of the program, it is possible to create a variety of lines, arcs, text dressing, taxis, 2D and 3D models, automate the solution of many problems that arise during the design process, create custom scenarios and macros, customize the system to specific (concrete) issues and applications. AutoCad package Auto LISP has a built-in programming language, with which the user can dress new commands and, in fact, use a high level of programming languages. For three-dimensional modeling at IBM and Macintosh fans, the company's splaynli modeling software, mostly Alias/Wavefront, is Sketch! used. This program provides high-quality visualization. Ray Dream AutoCAD software, however, has a special set of modeling tools that allow you to achieve photorealistic quality of the image. Macromodel package and Auto from Macromedia firm. See also. form of firm sys. The program Z has the means of modeling and deformation of three-dimensional objects. This program has the means of visualization, creation of shaded effects, placement of materials on surfaces (nalogenie materialov na poverxnosti). Among the most powerful modeling and design programs used on the workstations of Silikon Graphics, it is possible to include AutoCAD, Studio and Auto Studio programs of the firm Alias/ Wavefront. With the help of these programs, it is possible to simultaneously work with 2D and 3D models, as well as find solutions to the problem of embodiment with existing automated design systems. The AutoCAD program has enough tools for estimating the properties of geometrical objects, convenient equipment of animation, as well as a quality module of rendering, along with the application of a high level of modeling on the basis of splints. Kengaytirib it is possible to transform into a studio by filling out the possibilities of AutoCAD. The Studio program differs from AutoCAD in that it has a high possibility of modeling, the perfection of the system of working with words and curves, the additional possibilities of estimating the geometrical object, rendering and drawing. And AutoStudio came into existence as a result of the addition of special tools to the Studio program, specially designed for car designers, provoking models and animation. Also, these programs can be supplemented, supplemented with additional tools and options for use in multi-processor models of Siliconhics. In the SGI environment, it is possible to mention the Engineering Animation firm's Vislab program again within the hands-on automated design systems. This program allows you to create (dressing) a visual solution of design and engineering issues.

The common name for this type of software - CAD - means "automated design". Currently, various types of CAD systems are used in the work of architects, landscape designers, researchers and engineers. The first CAD designs were created in the 70-ies. They gave the opportunity to automate the solution of similar tasks. In the sewing industry, this was the gradation of patterns (proportionally changing the details of patterns depending on the size

range). Now the set of functions has become more extensive: color, work with the structure of the material, calculation of the optimal location of parts of the fabric, etc. Many CAD developers create programs to work with 2D schemes. In recent years, several new programs have appeared that allow you to immediately create and edit 3D models in a virtual mannequin at the same time. The main audience of this program is tailors and amateur fashion designers who have only basic design knowledge.

Below is a new program for designing and modeling AutoCAD graphics, thanks to which it is possible to optimize the working conditions and results:

- Less time is spent on the production of the product;
- The possibility of errors in calculations and other errors due to the "human factor" is excluded;
- Ability to reduce the cost of material for sewing due to the reasonable placement of patterns.

Depending on the type of software and the task at hand, clothes created with the help of design programs can be printed on a simple printer or professional plotter of clothing andases patterns. The digital layout is stored in the computer's memory, which allows you to create your own virtual library. Another important advantage in working with AutoCAD is the compatibility of the received drawings with GOST requirements. It has been shown to move and colorize andases in different ways according to the size range. There are also a number of other advantages of AutoCaD software.

After working out the details of the dress, the printed pattern is copied and gradation of patterns (the distance between them will be symmetrical) will be provided according to the size range. Construction of clothing schemes; ready-made clothing provides such opportunities as moving and viewing in a manicure. In order for us to learn more deeply how to work in the AutoCaD program, we will consider the sequence of designing and modeling any clothing..

After opening the interface of the AutoCAD program (Figure 1), we begin to design ourselves through the cursor, which is transferred to the symmetry axis. The required dimensions are entered. Symmetry arrows with the help of which the drawing is drawn. When drawing a drawing, the main work is done by the cursor the necessary dimensions are entered, the points are intersected after the points are marked.

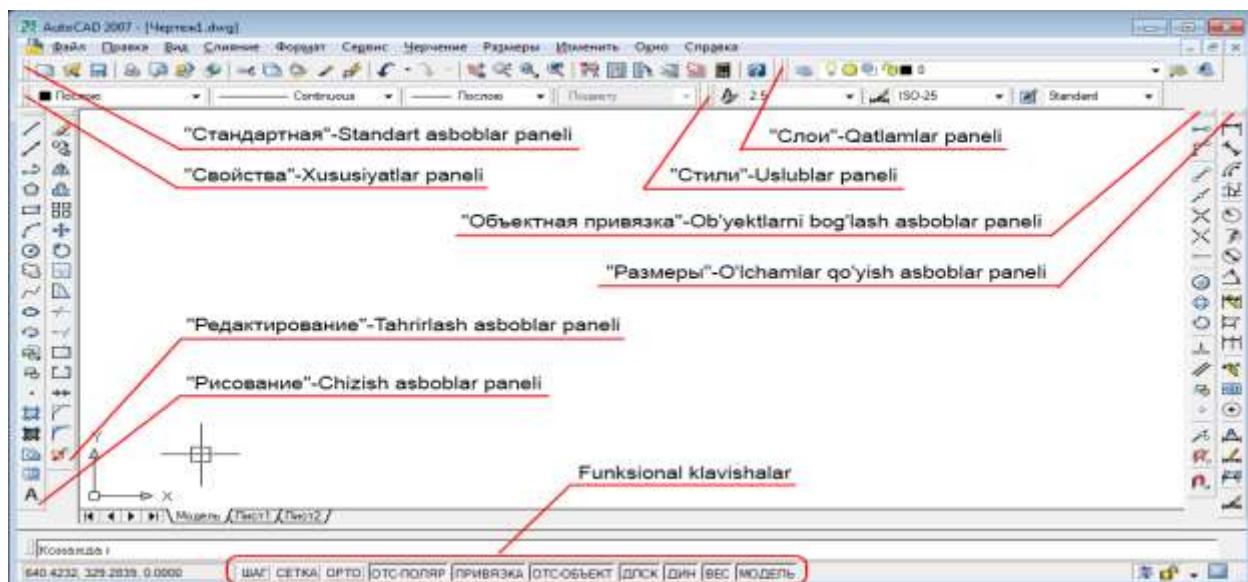


Figure 1. AutoCAD software interface.

Below you will find the basic panels we need from AutoCAD

1- "Drawing" - Drawing toolbar

This panel is used to directly draw, write, and create tables.

- "Cut" - Cut button.
- "Pryamaya" - Straight line button.
- "Polyline" - Custom line button.
- "Polygon" - Button for drawing polygons.
- Pyamougolnik - Button to draw a rectangle.
- "Arc" - Arc drawing button.
- "Circle" - Circle button.
- "Cloud" - Cloud drawing button.
- "Spline" - Button to draw local curves.
- "Ellipse" - Ellipse drawing button.
- "Elliptical arc" - Ellipse arc button.
- "Block" - Block button.
- "Create block" - Button to create a block.
- Point - Dot button.
- "Hatch..." - Hatch button.
- «Gradient...» - Color button.
- "Region" - Area selection button.
- «Table...» - Table... Create button.
- «Multi-line...» - Multi-line... text entry button.

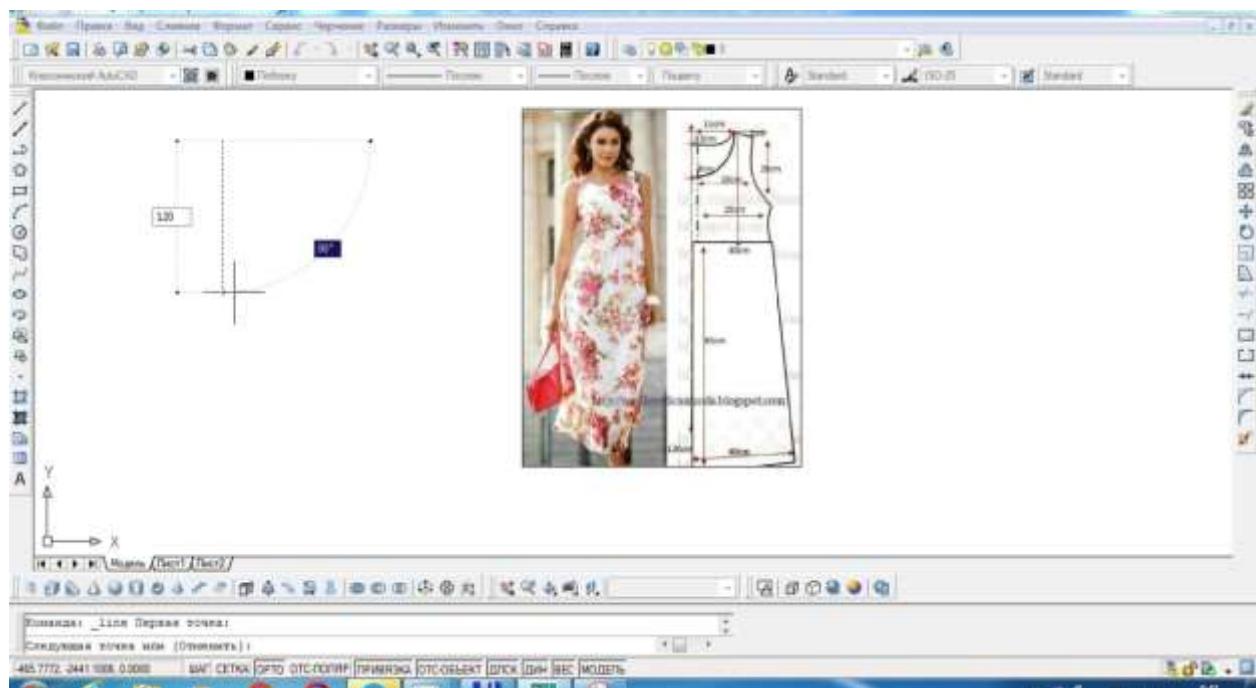


2- «Editing» - Editing toolbar Edit means change. The Edit toolbar is mainly used to edit created objects.

- Stere - Delete command
- Copy - Copy command
- Mirror - Mirror command
- Подобие - Identification command
- Array ... - Array... Multiplication command
- Perenesti - Move command
- Povernut - Turn command
- Scale - Scale command
- Stretch - Stretch command
- Cut - Cut command
- Udlinit - Extension command
- Disassemble to point - Disconnect command at one point
- Disconnect - Disconnect command
- Soedinit - Connect command
- Chassis - The chamfering command
- Connection - Connection command
- Calculate - Partition command
- Stere - Delete command.
- Shirt information



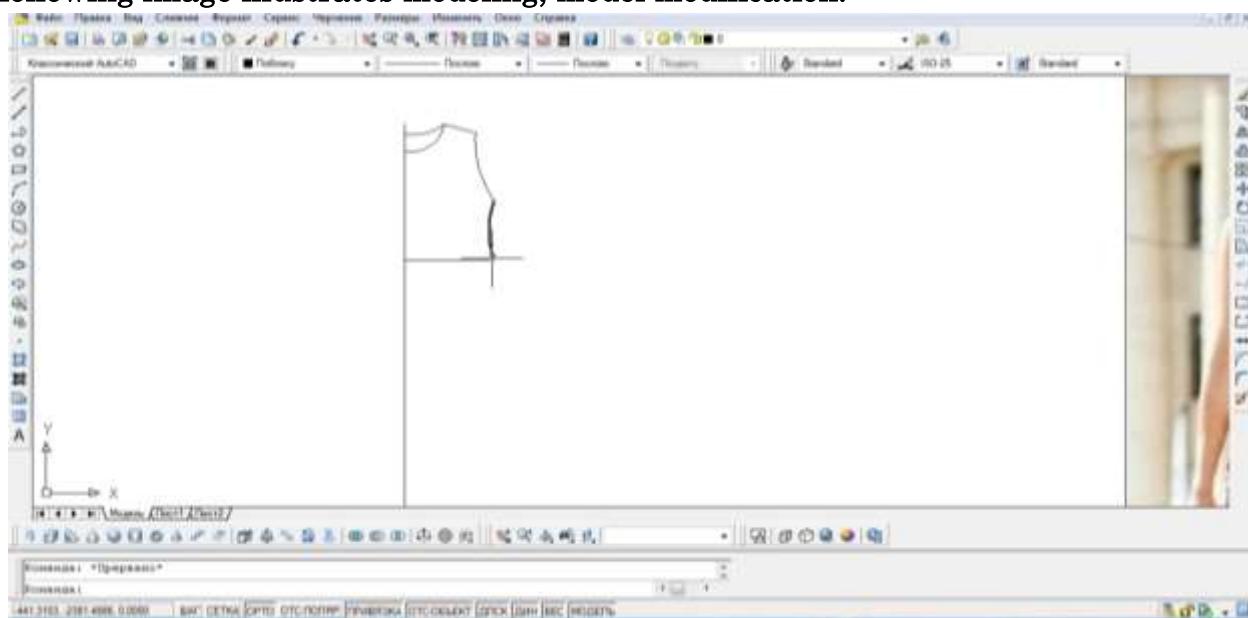
"Risovanie" - from the drawing toolbar" Otrezok " - an incision button. Through it we draw a straight line cut.



picture. Designing a women's stylish shirt in AutoCAD.

After preparing a single template of the desired size, it is symmetrically transferred to the second tamun. In this image, two parts of the back in the name of our clothes are designed, the back pieces are also copied from the front pieces.

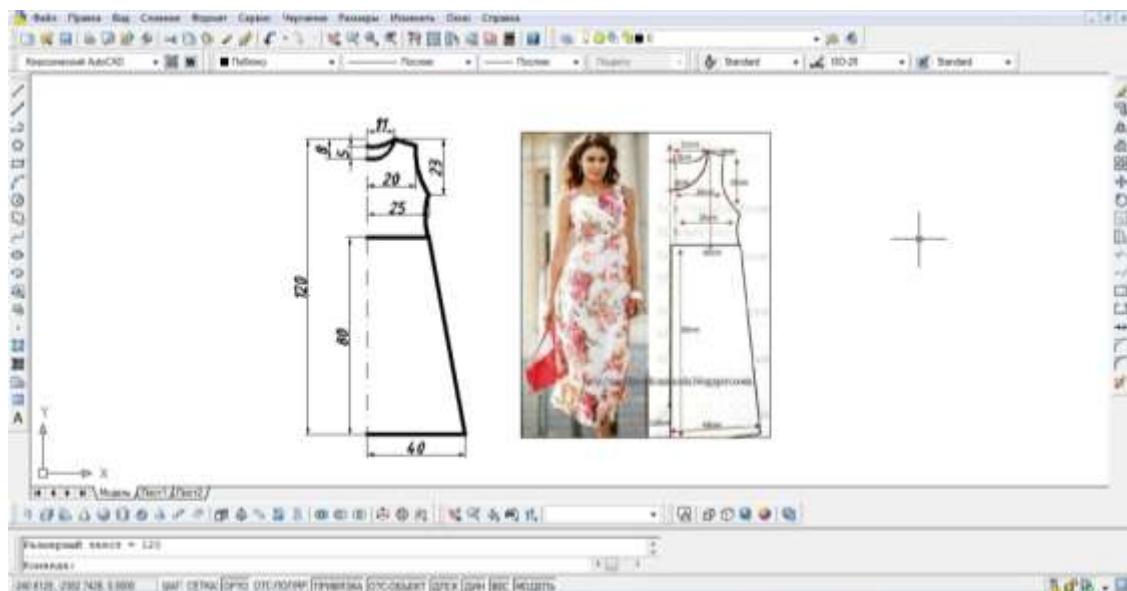
The following image illustrates modeling, model modification.



3-picture. Modeling is carried out on the basis of measurements.

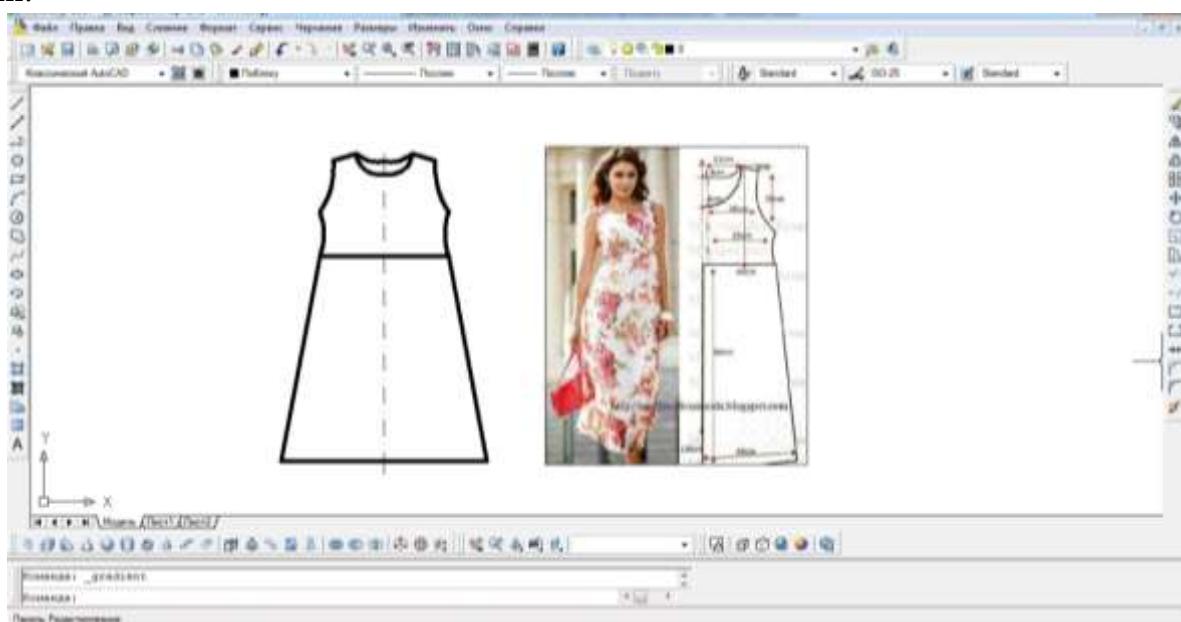
Having drawn the details of our clothes, we have prepared the Endi turn we can come to the exact size by determining the points on our body, this should be the same as the measurements that we chose for the manicure when we started the work. Apart from it, each bulge, pit and

bulging areas in the body member are determined by the program itself, which determines the size. We will be able to choose the sizes that will stick and throw off on average, depending on our wear and tear.



4-picture. Modeling has come to an end.

Modeled according to the measurements remained only coloring. The choice of Colors is also of course optional, depending on the season, depending on the type of clothes, the colors are embodied depending on the taste. We select the colors from the panel of the AutoCAD program.



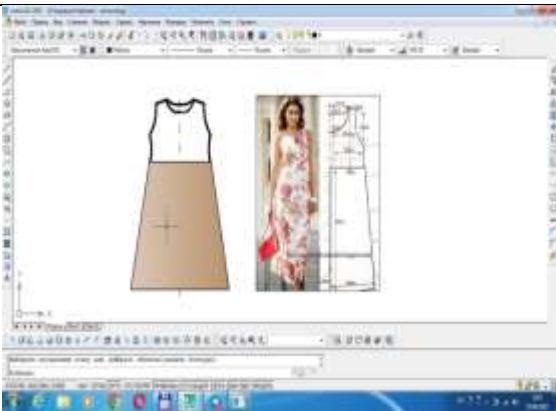
5-picture. The dress is made ready.

The dress in the modern assortment was also ready. The sequence of work is shown in the images above. This means that with the help of AutoCAD graphics software, we can design and model our clothes in the desired model and modern assortment. Through the AutoCAD graphics program, we can design and model not only women's clothing, but also men's clothing as well as children's clothing for all ages. Another good theme is that knowledge skills and skills are well developed in students by seeing if they use video in their practical training.

The AutoCad design product is designed for professionals in the field of fashion, who seek to calculate the maximum detail of the cut, fit and material properties of the product. The program can also Model two-dimensional parts, but the main emphasis will be on working with 3D-objects. Perhaps the only drawback of this program is that there is no possibility of modeling the pattern.

Table 1. Technological map of modeling women's shirts based on AutoCAD program

T/r	Working sequence	Business note	The procedure for performing the operation on a standard basis
1	A women's shirt with a holistic physique is chosen		There is a basis of the hull, I drew it in advance. Here we just draw a women's shirt.
2	The first line is drawn		We draw a geometrical line as we looked before.
3	2-the model line is drawn		We divide the geometric line by points with the mouse and draw the shape we need.
4	Model lines are seen in size		We divide the geometric line by points with the mouse and draw the shape we need.

5	The bottom of the women's shirt is drawn		With the help of the AutoCAD tool, we can prepare the upper parts and combine them without the release of the mouse.
6	The inserted lines are clearly indicated		After our women's shirt is ready, you can see that the shirt we remove the lines on the side.
7	Women's shirts are ready.		The women's shirt is ready, the coloring is optional.

CONCLUSION

The state of the use of computer programs in the design and modeling of sewing items in higher educational institutions and scientific research work were analyzed and developed scientific methodological recommendations.

Technical creativity and graphic-computing skills, constructing, modeling methods, advantages of using computer programs and specific features of the students in the service Direction were determined.

On the basis of an innovative approach to professional activity focused on the development of competence in the design and modeling of sewing itemstirishga AutoCAD, Studio and Auto Studio, 2D and 3D models, through the use of CorelDraw computer software developed the methodology of teaching specialty subjects.

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