

# BUNIN YELETS STATE UNIVERSITY

Director of the Institute of Culture, History  
and Law /I.A. Karpacheva/



## **THE WORK PROGRAMME OF THE DISCIPLINE** **B1.E.01.03 Technical, design and computer graphics**

**Direction of training:** 44.03.01 *Pedagogical Education*

**Programme:** *Fine Arts*

**Qualification (degree):** *bachelor*

**Mode of study:** *full-time*

**Institute of Culture, History and Law**

**Department:** *Design, Art Education and Technology*

	full-time form	full-time and part-time form	part-time form
Study course	1, 2, 3, 4		
Term	1, 2, 3, 4, 5, 6, 8		
Lectures	18		
Laboratory work	170		
Seminars (practical work)			
including practical training			
Form(s) of control	Credit test 3, 5 term Credit test with grade 2, 4, 8 term Exam 1, 6 term – 0,6		
Control	18		
Other forms of work			
Independent work	189,4		

**Total number of academic hours:** 396

**Labour intensity:** 11 credits

*Developer of the work programme:*

*Associate Professor Solomentseva S.B.*

## I. ORGANIZATIONAL AND METHODOLOGICAL SECTION

**The purpose of studying the discipline:** developing the ability to teach a subject based on the use of subject methods and the application of modern educational technologies that ensure the achievement of meta-subject, subject and personal results. Forming skills in applying subject knowledge in the implementation of the educational process.

### **Objectives of studying the discipline:**

- explore the origins of the formation of styles in graphic design;
- study the stylistic features of graphics of the late 19th - early 20th centuries;
- teach how to use computer graphics in the modern educational process;
- master the basics of working in the vector computer graphics editor Corel Draw;
- teach how to develop visual components of educational programs using vector computer graphics;
- study the basics of the design process for creating educational materials using computer graphics;
- explore modern trends in the use of computer, information and communication, animation technologies in the educational process;
- study the basic rules of technical drawing and methods of conveying volume;
- teach how to perform perspective constructions;
- master the basics of 3D design in the free software Blender;
- teach how to render objects in Blender.

**The place of the discipline in the structure of the basic professional educational program:** it is implemented within the framework of the variable part (the part formed by the participants of educational relations) of block B1. Disciplines (modules).

### **Planned learning outcomes for the discipline:**

Competence code	Indicators of competence achievement	Planned learning outcomes for the discipline
PCS-1	To know: <ul style="list-style-type: none"><li>– fundamentals of specific teaching methods(techniques) in the subject area;</li><li>– characteristics of students' personal, meta-subject and subject results in the context of teaching in the subject area (according to the Federal State Educational Standard and the model curriculum);</li><li>– modern educational technologies and methodological patterns of their selection;</li><li>– methods of monitoring, assessing and correcting learning results in the subject area.</li></ul>	Knows: <ul style="list-style-type: none"><li>– fundamentals of specific methods (techniques) of teaching technical, design and computer graphics;</li><li>– characteristics of personal, meta-subject and subject results of students in the context of teaching various types of graphics;</li><li>– modern educational technologies and methodological patterns of their selection;</li><li>– methods of monitoring, evaluating and correcting learning outcomes in various types of graphics.</li></ul>

	<p>To be able to:</p> <ul style="list-style-type: none"> <li>– design a work program in the subject area;</li> <li>– design and implement various forms of training and organization of extracurricular activities of students in the subject area (profiles) ensuring the achievement of meta-subject, subject and personal results.</li> </ul>	<p>Is able to:</p> <ul style="list-style-type: none"> <li>– design a production program for technical, design and computer graphics; design and implement various forms of training and organization of extracurricular activities for students in certain types of graphics, ensuring the achievement of meta-subject, subject and personal results.</li> </ul>
	<p>To possess:</p> <ul style="list-style-type: none"> <li>– teaching methods in the subject area and the methodology for their selection taking into account the specifics of the content of the educational material, age and educational needs of students;</li> <li>– modern educational technologies ensuring the achievement of students' meta-subject, subject and personal results;</li> <li>– methods of monitoring, assessing and correcting learning results in the subject area.</li> </ul>	<p>Possesses:</p> <ul style="list-style-type: none"> <li>– methods of teaching various types of graphics and methods of their selection taking into account the specifics of the content of the educational material, age and educational needs of students;</li> <li>– modern educational digital technologies that ensure that students achieve meta-subject, subject and personal results;</li> <li>– methods of monitoring, assessing and correcting learning outcomes for various types of graphics.</li> </ul>
<b>PCS-2</b>	<p>To know:</p> <ul style="list-style-type: none"> <li>– patterns, principles and levels of formation and implementation of educational content in the subject area;</li> <li>– structure, composition and didactic units of the content of a school subject in the subject area;</li> <li>– subject content in the subject area;</li> <li>– skills in selecting variable content taking into account the relationship between class and extracurricular forms of training in the subject area.</li> </ul>	<p>Knows:</p> <ul style="list-style-type: none"> <li>– formalities, principles and rules, formation and implementation of educational content in technical, design and computer graphics;</li> <li>– structure, composition and didactic consequences of the content of the subject in various types of graphs;</li> <li>– subject content of technical, design and computer graphics;</li> <li>– methods of selecting variable content taking into account the relationship between class and extracurricular forms of education in various types of graphs.</li> </ul>
	<p>To be able to:</p> <ul style="list-style-type: none"> <li>– select educational content for implementation in various forms of training in the subject area in accordance with the didactic goals, age characteristics of students and the requirements of the Federal State Educational Standard of General Education.</li> </ul>	<p>Is able to:</p> <ul style="list-style-type: none"> <li>– select educational content for implementation in various forms of training in technical, design and computer graphics in accordance with didactic goals, age characteristics of students and the requirements of Federal State Educational Standard of General Education.</li> </ul>
	<p>To possess:</p> <ul style="list-style-type: none"> <li>– subject content of disciplines corresponding to the Pedagogical Education programme Fine Arts;</li> </ul>	<p>Possesses:</p> <ul style="list-style-type: none"> <li>– subject content of disciplines corresponding to the program of pedagogical education "Fine Arts";</li> </ul>

	– skills in selecting variable content taking into account the relationship between class and extracurricular forms of training in the subject area.	– skills in selecting variable content taking into account the relationship between class and extracurricular forms of training in technical, design and computer graphics.
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## II. CONTENT AND SCOPE OF THE DISCIPLINE

indicating the number of hours allocated for contact work of students with the teacher (by type of class) and for independent work

### Full-time education

№	Name of sections and topics	Total	Classroom lessons			Ind. work.
			Lec.	Sem. (pract.)	Lab.	
1	2	3	4	5	6	7
	<b>Section 1. The origins of the formation of styles in graphic design.</b>	<b>98,7</b>	<b>18</b>		<b>36</b>	<b>44,7</b>
1.	Topic 1. "Victorian style" and the "Arts and Crafts movement".	16	4		6	6
2.	Topic 2. "Art Nouveau" in France and Belgium.	16	4		6	6
3.	Topic 3. Features of the "Jugendstil" in Germany.	14	2		6	6
4.	Topic 4. "Modern style" in England. "Glasgow Style" in Scotland.	14,7	2		4	8,7
5.	Topic 5. Features of the "Vienna Secession" style in Austria.	14	2		6	6
6.	Topic 6. Features of the "Liberty style" in Italy.	12	2		4	6
7.	Topic 7. Formation and development of the "Tiffany Style" in the USA.	12	2		4	6
	<i>Control</i>	<i>9</i>				
	<i>Exam</i>	<i>0,3</i>				
	<i>Total for 1 term</i>	<i>108</i>	<i>18</i>		<i>36</i>	<i>44,7</i>
	<b>Section 2. Stylistic features of graphics of the late 19th - early 20th centuries.</b>	<b>36</b>			<b>18</b>	<b>18</b>
8.	Topic 8. "Russian style" in art.	4			2	2
9.	Topic 9. Characteristic features of the "Neo-Russian style".	8			4	4
10.	Topic 10. 5. The activities of the art society "World of Art".	8			4	4
11.	Topic 11. Early modernism.	4			2	2
12.	Topic 12. The style of "Modernism" and its varieties.	12			6	6
	<i>Credit test with grade</i>					
	<i>Total for 2 term</i>	<i>36</i>			<i>18</i>	<i>18</i>
	<b>Section 3. Computer graphics in</b>	<b>12</b>			<b>6</b>	<b>6</b>

	<b>the modern educational process.</b>					
13.	Topic 13. Priority areas for the development of the education system in the Russian Federation, requirements for the use of modern computer technologies in federal state educational standards.	6			2	4
14.	Topic 14. Basic concepts of computer graphics.	6			4	2
	<b>Section 4. Basics of working in the vector computer graphics editor Corel Draw.</b>	<b>24</b>			<b>12</b>	<b>12</b>
15.	Topic 15. Corel Draw: basic information.	8			4	4
16.	Topic 16. Graphic primitives.	8			4	4
17.	Topic 17. Construction and transformation of primitives.	8			4	4
	<i>Credit test</i>					
	<i>Total for 3 term</i>	<i>36</i>			<i>18</i>	<i>18</i>
	<b>Section 5. Development of visual components of educational programs using vector computer graphics.</b>	<b>36</b>			<b>18</b>	<b>18</b>
18.	Topic 18. Image editing. Creating a composition. Precise positioning, blocking and grouping images.	8			4	4
19.	Topic 19. Object overlay techniques. Boolean operations. Cloning and duplicating objects. Creating contours. Bezier curves.	8			4	4
20.	Topic 20. Fill and stroke logic. Interactive distortion. The Text function.	4			2	2
21.	Topic 21. Artistic tools of Corel Draw. An example of creating a logo. Special effects of Corel Draw.	8			4	4
22.	Topic 22. Working with raster images in Corel Draw. Creating original layouts.	8			4	4
	<i>Credit test with grade</i>					
	<i>Total for 4 term</i>	<i>36</i>			<i>18</i>	<i>18</i>
	<b>Section 6. Fundamentals of the design process for creating educational materials using computer graphics.</b>	<b>14</b>			<b>14</b>	
23.	Topic 23. Stages of computer design of educational materials.	4			4	
24.	Topic 24. Graphic file formats. Compression of graphic information.	4			4	
25.	Topic 25. Color in computer design	6			6	

	of educational and methodological materials.					
	<b>Section 7. Current trends in the use of computer, information and communication, animation technologies in the educational process.</b>	<b>22</b>			<b>18</b>	<b>4</b>
26.	Topic 26. Development of multimedia materials for methodological support of educational classes in an educational organization.	8			6	2
27.	Topic 27. Basics of frame-by-frame animation.	8			6	2
28.	Topic 28. Promising directions for the development of computer graphics. Requirements for the competence of a teacher in the field of using modern computer technologies.	6			6	
	<i>Credit test</i>					
	<i>Total for 5 term</i>	<i>36</i>			<i>32</i>	<i>4</i>
	<b>Section 8. Basic rules and techniques of technical drawing.</b>	<b>8</b>			<b>4</b>	<b>4</b>
29.	Topic 29. Elementary constructions in technical drawing.	4			2	2
30.	Topic 30. Axonometric projections. Basic views and sections in axonometric projections.	4			2	2
	<b>Section 9. Methods of conveying volume in technical drawing.</b>	<b>8</b>			<b>4</b>	<b>4</b>
31.	Topic 31. Various methods of shading.	2			2	2
32.	Topic 32. Drawing details from life and from a drawing.	2			2	2
	<b>Section 10. Basics of perspective constructions.</b>	<b>10,7</b>			<b>4</b>	<b>6,7</b>
33.	Topic 33. Perspective. Basic concepts and methods of constructing objects.	6,7			2	4,7
34.	Topic 34. Perspective analysis of art paintings.	4			2	2
	<i>Control</i>	<i>9</i>				
	<i>Exam</i>	<i>0,3</i>				
	<i>Total for 6 term</i>	<i>36</i>			<i>12</i>	<i>14,7</i>
	<b>Section 11. Basics of 3D design in the open-source software Blender.</b>	<b>54</b>			<b>18</b>	<b>36</b>
35.	Topic 35. Blender Interface Overview and File Handling.	18			6	12
36.	Topic 36. Simple modeling with Mesh.	18			6	12
37.	Topic 37. Curves, NURBS surfaces.	18			6	12

	<b>Section 12. Rendering in Blender.</b>	<b>54</b>			<b>18</b>	<b>36</b>
38.	Topic 38. Materials and textures.	18			6	12
39.	Topic 39. Creating physical properties of objects in Blender.	18			6	12
40.	Topic 40. Light, cameras and environment.	18			6	12
	<i>Credit test with grade</i>					
	<i>Total for 8 term</i>	<i>108</i>			<i>36</i>	<i>72</i>
	<b>Total number of academic hours:</b>	<b>396</b>	<b>18</b>		<b>170</b>	<b>189,4</b>

### **Full-time and part-time education (not implemented)**

### **Part-time education (not implemented)**

## **III. EVALUATION MATERIALS FOR CONDUCTING CURRENT AND INTER-IM CERTIFICATION OF STUDENTS IN THE DISCIPLINE**

Current certification is carried out in the form of tests, abstracts, creative assignments, etc.

### **Standard version of the test (3 term)**

1. Which of the following is not an element of the CorelDraw program:

- a) dockers (provide many functional capabilities of the program)
- b) color palette (contains colors used in the document)
- c) status bar (informs about objects and actions performed)
- d) 3D scene (provides viewing of the object in 3D mode)

2. How many basic colors is the CMYK color model based on:

- a) 4
- b) 6
- c) 3
- d) 2

3. Which image format is vector:

- a) .bmp
- b) .tiff
- c) .doc
- d) .jpg

4. dpi is:

- a) color characteristic
- b) image resolution
- c) file format
- d) video card characteristic

5. Which of these statements is incorrect:

- a) in CorelDraw, contours are built using the SHAPE tool

- b) in CorelDraw, contours are built using the FREE tools SHAPE.
- c) in CorelDraw, contours are constructed using the PEN tool
- d) in CorelDraw, contours are constructed using the BEZIER tools

6. Which of these statements is incorrect:

- a) nodes can be smooth
- b) nodes can be symmetrical
- c) nodes can be sharp
- d) nodes can be asymmetrical

7. Which contours cannot have a fill:

- a) closed
- b) unclosed
- c) smoothed
- d) without a stroke

8. Transformation of objects is carried out using tools (select the incorrect answer):

- a) SHAPE tool, FREE SHAPE
- b) FORMATION docker
- c) OUTLINE tool
- d) POINTER tool

9. Operations of copying and duplicating objects between documents are performed using:

- a) mouse
- b) clipboard
- c) POINTER tool
- d) property bar

10. The SHAPE tool allows you to (select the incorrect answer) judgment):

- a) copy nodes
- b) change segment types and curvature
- c) add and delete nodes
- d) move nodes

### **Standard version of the test (4 term)**

1. Choose the correct statement:

- a) the CorelDraw graphics editor is a raster editor
- b) vector images take up more disk space than raster images
- c) vector images can be enlarged infinitely without changing the image quality
- d) in vector format you can get an image of photographic quality

2. Graphic primitives include (choose the wrong answer):

- a) spirals and tables
- b) circles (ellipses)
- c) polygons



d) rectangles

3. If it is necessary to edit primitives by nodes, they should (choose the correct answer):

- a) grouped
- b) united
- c) pre-converted to curves
- d) aligned

4. Choose the incorrect statement:

- a) when duplicating an object, the connection with the original is maintained
- b) when cloning an object, the connection with the original is maintained
- c) exclusion means subtracting one object from another
- d) you can draw straight lines with the Bezier tool

5. Which panel of the CorelDraw interface does not exist:

- a) menu bar
- b) properties panel
- c) standard panel
- d) basic shapes

6. Choose the wrong statement

- a) the RGB color model is based on 3 basic colors: red, yellow and green
- b) the CMYK color model has black
- c) the Lab color model contains the value of lightness
- d) the HSB color model contains the value of color brightness

7. Choose the right statement:

- a) artistic text can be placed along a curve
- b) artistic text in Corel Draw is located in a frame
- c) the characters in artistic text are artistic
- d) artistic text in Corel Draw is intended for entering large text arrays

8. The "Import" button in the standard Corel Draw editor panel is used:

- a) to publish a vector image in raster format
- b) to import a new color library
- c) to enter a raster image into paper space
- d) to trace raster images

9. Tracing images is:

- a) converting a vector image to a raster
- b) converting a raster image to vector
- c) bringing a vector image closer to photographic quality
- d) compressing an image to reduce the format

10. Touchpad:

- a) is an output device
- b) is used to convert a raster image into a vector
- c) is a mouse substitute
- d) is an input device

**Standard version of the test (5 term)**

1. The interface elements of graphic programs include:

Select one correct answer:

- a) toolbar
- b) floating palettes
- c) document window
- d) all answers are correct

2. Graphic primitives in computer graphics are:

Select one correct answer:

- a) simplest figures drawn using special tools of a graphic editor
- b) graphic editor environment
- c) operations performed on files containing images created in a graphic editor
- d) graphic editor operating modes

3. Which key can be used to draw strictly horizontal or vertical lines in graphic editors?

Select one correct answer:

- a) F1
- b) Insert
- c) Shift
- d) All answers are correct

4. Which of these properties does a line in computer graphics not have?

Select one correct answer:

- a) weight
- b) thickness
- c) color
- d) all answers are incorrect

5. Which parameter is not typical for open-source software designed to create computer graphics?

Select one correct answer:

- a) no licensing restrictions
- b) the ability to independently modify programs
- c) cross-platform
- d) high cost of software

6. What is the name of a set of computer technologies that simultaneously use several information environments: text, photos and illustrative material, video, animation, sound?

Select one correct answer:

- a) computer graphics
- b) e-book
- c) multimedia
- d) all answers are correct

7. What is the name of a sequence of video images in binary representation, intended for playback on a digital monitor?

Select one correct answer:

- a) digital video
- b) digital infrastructure
- c) digital culture
- d) all answers are correct

8. What elements are included in modern educational multimedia technologies?

Select three correct answers:

- a) illustrative graphics
- b) audio accompaniment
- c) video materials
- d) production equipment

9. To obtain a moving image, the following is used:

Select one correct answer:

- a) business graphics
- b) animation graphics
- c) scientific graphics
- d) illustrative graphics

10. Hardware and software tools for educational multimedia include:

Select one correct answer:

- a) multimedia software
- b) image creation and processing tools
- c) sound recording and playback tools
- d) all answers are correct

### **Standard version of the test (6 term)**

1. GOST provides for the following size for A4 format:

- a) 297x210;
- b) 297x420;
- c) 420x594.

2. The height of lowercase letters of drawing font No. 20 is:

- a) 10;
- b) 14;
- c) 17.

3. To draw extension and dimension lines, construction lines, for shading sections, leader lines, and underlining inscriptions, use:

- a) solid wavy line;
- b) solid main line;
- c) solid thin line.

4. A technical drawing is not cut if:

- a) the part has symmetry in two directions and an internal structure that requires explanation;
- b) the part has no symmetry in two directions, but there is an internal structure that requires explanation;
- c) there is no internal structure that requires explanation.

5. The picture plane is the plane on which:

- a) objects are located;
- b) images are located;
- c) the point of view is located.

6. The angle of clear vision in a perspective image is formed when the distance from the viewer to the picture is equal to:

- a) 1.5 – 2 the largest dimensions of the depicted object;
- b) the largest dimension of the object;
- c) the smallest dimension of the object.

7. Projection is:

- a) the process of obtaining an image on a plane;
- b) the process of constructing a real spatial object;
- c) the process of mentally transforming a shape taking into account given conditions.

8. What is the approximate angle of inclination of the Y axis to the horizontal line in a rectangular dimetric projection:

- a)  $35^\circ$ ;
- b)  $41^\circ$ ;
- c)  $47^\circ$ ;
- d)  $60^\circ$ .

9. When constructing perspective images, the following is used:

- a) orthogonal projection;
- b) oblique projection;
- c) central projection.

10. When shading visual images, lighting is assumed to be:

- a) straight ahead;
- b) top left;
- c) top front.

### Standard version of the test (8 term)

1. Three-dimensional graphics is a section of computer graphics, a set of techniques and tools (both software and hardware) designed for:

Select one correct answer:

- a) creating volumetric objects
- b) images of black and white drawings
- c) creating raster primitives
- d) images of color sketches

2. What standard graphic Mesh objects are used in Blender?

Select several correct answers:

- a) cube
- b) monkey
- c) cylinder
- d) torus





3. Which graphic editor is designed to create spatial 3D models?

Select one correct answer:

- a) Inkscape
- b) Blender
- c) GIMP
- d) CorelDraw

4. Which image on the toolbar is used to select objects?

Choose one correct answer:

- a) 
- b) 
- c) 
- d) 

5. Complete the definition:

The process of creating a visual effect of movement of a 3D object using computer graphics is called \_\_\_\_\_.

6. Match the terms used to create three-dimensional objects with their definitions:

1. Scene

a) a way to indicate the location of objects in relation to other objects

2. Axis

b) a set of models, animations, materials, light sources and cameras

3. Coordinate system

c) a line drawn in a certain direction

7. Complete the definition:

The state of rest, equilibrium of the shape of a 3D object, the stability of the geometric base is statics, and the visual perception of movement, the swiftness of the shape is \_\_\_\_\_.

8. The advantages of 3D computer graphics include:

Choose one correct answer:

a) the ability to view an object from all sides

b) the ability to use different textures and materials when visualizing an object

c) the ability to adjust the desired lighting parameters

d) all answers are correct

9. Restore the logical sequence of developing a 3D object using computer graphics:

1. a) creating a 3D object from primitives

2. b) creating lighting

3. c) applying basic materials to a 3D object

4. d) formulating the idea, concept of the project

10. What system is used in Blender to animate characters?

Select one correct answer:

a) sculpting

b) modification

c) armature

d) all answers are incorrect

### **Sample topics for abstracts (2 term)**

1. Sociocultural and scientific-technical prerequisites for the emergence and development of graphic design.
2. Avant-garde trends in design at the beginning of the 20th century.
3. Reflection of the First World War in the design of the early 20th century.
4. Bauhaus. Its influence on the development of design engineering.
5. Engraving in the history of graphic design.
6. Propaganda art and outdoor advertising during the formation of the Soviet Republic.
7. Advertising graphics of the first years of Soviet power.
8. Suprematism in graphic design.
9. The theme of space in graphic design.
10. Pop art and op art in graphic design.
11. Utopian projects of radical design and anti-design.
12. Postmodernism in design.

13. Anti-design. Radical design.
14. The structure of modern art education.
15. Problems of art education.

#### **Sample topics for abstracts (5 term)**

1. Computer graphics in the modern educational and socio-cultural environment.
2. Art and modern computer graphics.
3. Features of the formation and development of computer graphics as an independent direction of art.
4. Works of computer graphics as a cultural and educational phenomenon.
5. Features of the use of computer graphics in multimedia publications.
6. Innovative technical means of computer graphics.
7. Computer graphics as a means of visual communication in education.
8. Genesis of font styles in computer typography.
9. Psychology of color perception in computer graphics.
10. Comparative analysis of color models in computer graphics.
11. Means and techniques of photo composition in computer graphics.
12. Features of the use of computer graphics in the formation of the design of a virtual educational environment.

#### **Sample topics for abstracts (8 term)**

1. Promising directions of development of 3D technologies in art.
2. Methods of designing 3D objects, principles of combinatorial solution.
3. 3D technologies and modern lifestyle.
4. Modern virtual modeling of objects as a way of intercultural communication.
5. Pre-project and project analysis in 3D design.
6. Analysis of software products for virtual 3D design.
7. Modern trends and directions of development of virtual design methods.
8. 3D stereograms as a type of modern art.
9. History of creation and development of computer 3D design.
10. Modern developments in the field of 3D displays.
11. Comparative analysis of universal 3D graphics packages.
12. Basic principles of demonstration of educational films in 3-D, 4-D and 5-D formats.

#### **Sample topics for creative assignments (1 term)**

1. Perform stylization and transformation of the proposed creative source.
2. Develop a concept for an advertising design project for an educational institution.
3. Create a sketch (draft) reflecting the graphic solution for an advertising design project for an educational institution.
4. Develop a design project in one of the graphic styles of the early 20th century.
5. Create a digital portfolio of original works.

#### **Sample topics for creative assignments (5 term)**

6. Using visual effects techniques, depict a composition with a motion effect on the topic "Sports in My Life", which can later be used for methodological support of classes. A4 format, computer graphics.
7. Using collage methods, layer styles, blending modes, etc., develop a decorative design for text inscriptions, which can later be used for methodological support of classes. A4 format, computer graphics.
8. Perform restoration and retouching of a damaged historical photograph, which can later be used for methodological support of classes and design of multimedia files. Original photograph format, resolution 300 dpi, computer graphics.

#### **Sample topics for creative assignments (6 term)**

1. Constructing an angle of a given size.  
Construct an angle equal to approximately 7 degrees.
2. Dividing an angle into a given number of parts.  
Divide an angle of any size into 3 equal parts.
3. Dividing a segment into a given number of parts.  
Divide a segment of any size into 7 equal parts.

#### **Sample topics for creative assignments (8 term)**

1. Based on the analysis of data on the proposed functions of the 3D object, its appearance and location, perform a pre-project analysis and formulate a theoretical concept. Describe the principles of 3D design and the features of form-building proposed for use in the course of the project.
2. Create a sketch reflecting the volumetric and coloristic solution of the designed object, its plasticity. Format A3 or A4, technique - black-and-white or color graphics.
3. In accordance with the developed concept, using the techniques of movement, rotation, modeling, etc., create a virtual 3D model of the object. Technique - computer 3D graphics.
4. To give greater realism, perform texturing (overlying materials) on the 3D object. Technique - computer 3D graphics.
5. For a holistic perception of the created 3D object, create lighting, having previously selected the most advantageous observation points, levels of brightness, sharpness, shadow depth, etc. Technology – computer 3D graphics.

Interim assessment of students is carried out in the form of a credit test, a credit test with grade, an exam using the following assessment materials: list of questions for a credit test, list of questions for a credit test with grade, list of questions for an exam.

#### **List of questions for the exam (1 term, Full-time education)**

1. The origins of the formation of styles in graphic design.
2. Characteristics of styles in graphic design of the mid-19th century – early 20th century.
3. Features of the “Victorian style”.
4. Reasons for the formation of the “Victorian graphic style”.



5. Features of the “Arts and Crafts movement”. Distinctive Features of the “Victorian Style” and the “Arts and Crafts Movement”.
6. The work of William Morris, the theorist of the “Arts and Crafts movement”.
7. “Art Nouveau” in France and Belgium.
8. The work of Jules Cheret, the creator of a new direction in art.
9. The work of Alphonse Mucha, the author of iconic images of the “Art Nouveau style”.
10. Features of the "Jugendstil" in Germany.
11. The work of Peter Behrens, a graphic artist in the spirit of German engraving.
12. "Modern style" in England.
13. The work of Charles Rennie Mackintosh, a prominent representative of the “Modern style”.
14. "Glasgow Style" in Scotland.
15. Features of the “Vienna Secession” style in Austria.
16. The works of Gustav Klimt – a prominent representative of the “Vienna Secession”
17. Features of the “Liberty style” in Italy.
18. Formation and development of the "Tiffany Style" in the USA.

**List of questions for the credit test with grade  
(2 term, Full-time education)**

1. "Russian style" in art.
2. Characteristic features of the "Neo-Russian style".
3. The works of Viktor Vasnetsov.
4. Analysis of the works of Mikhail Vrubel.
5. The activities of the art society "World of Art".
6. The works of Leon Bakst.
7. Analysis of the works of Nicholas Roerich.
8. Transformation of the book publishing business by Mstislav Dobuzhinsky.
9. Sergey Chekhnin - a virtuoso of graphics.
10. Early modernism.
11. The style of the "Vienna workshops".
12. "Poster style" and industrial art.
13. "Expressionism" as a synthesis of European innovations.
14. The style of "Modernism" and its varieties.
15. The ideas of "Futurism" in graphic design.
16. The stylistic features of "Vorticism".
17. The concept of "Dadaism" in graphic design.
18. "Constructivism" in graphic works.
19. The creative works of Vladimir Tatlin, El Lissitzky and Alexander Rodchenko.
20. Artistic features of the "Style" group.
21. Features of graphic functionalism of the "Bauhaus".
22. "New typography" as a graphic style.

**List of questions for the credit test  
(3 term, Full-time education)**

1. Priority areas of development of the education system.

2. Requirements for the use of modern computer technologies in federal state educational standards.
3. History, methodology, classification and essence of modern educational computer technologies.
4. Features of planning and conducting classes with elements of computer graphics and information and communication technologies.
5. Techniques for developing and implementing elements of programs of academic disciplines related to computer graphics.
6. Basic concepts of computer graphics.
7. Purpose, role and stages of implementation of computer graphics in the educational process.
8. Basic functional characteristics of modern computers.
9. Basics of working in the vector computer graphics editor Corel Draw.
10. Interface elements.
11. Tools for customizing the work environment.
12. Tools for creating objects.
13. On-screen color palette.
14. The concept of an object in Corel Draw.
15. Properties of objects.
16. Constructing a rectangle in Corel Draw.
17. Ellipse, circle.
18. Polygon, stars and spirals in Corel Draw.

**List of questions for the credit test with grade  
(4 term, Full-time education)**

1. Development of visual components of educational programs using vector computer graphics.
2. Editing images in Corel Draw.
3. Selecting objects. Changing the image viewing scale.
4. Undoing and redoing the last actions.
5. Creating a composition in Corel Draw.
6. Moving, copying and deleting objects.
7. Precise positioning. Measuring rulers. Grid. Guides.
8. Locking objects. Grouping objects.
9. Methods of overlaying objects in Corel Draw.
10. Boolean operations.
11. Cloning and duplicating objects.
12. Creating contours. Bezier curves.
13. Fill and stroke logic. Interactive distortion.
14. The "Text" function in Corel Draw.
15. Artistic tools in Corel Draw.
16. Special effects in Corel Draw.
17. Working with raster images in Corel Draw.
18. Features of developing a handout layout in Corel Draw.

**List of questions for the credit test  
(5 term, Full-time education)**

1. Components of project activities in computer graphics.
2. Stages of computer design of educational materials.
3. Typologies of objects of computer design of educational and methodological materials.
4. Interpretation of the concept of "composition" in computer graphics.
5. Principles of compositional organization of educational materials using computer technologies.
6. Graphic file formats.
7. Graphic format parameters.
8. Raster graphic formats.
9. Vector graphic formats
10. Specifics of the process of perception of visual information in computer form.
11. Features of perception of verbal information in computer form.
12. Techniques and means of compositional organization of educational materials using computer technologies.
13. Color harmony in computer graphics.
14. Emotional and spatial properties of color.
15. The role of socio-cultural factors in color assessment.
16. Current trends in the use of computer, information and communication, animation technologies in the educational process.
17. Development of multimedia materials for methodological support of educational classes in an educational organization.
18. Basics of frame-by-frame animation.
19. Promising directions for the development of computer graphics.
20. Requirements for the competence of a teacher in the field of using modern computer technologies.

**List of questions for the exam  
(6 term, Full-time education)**

1. Technical drawing.
2. Rules for drawing straight and curved lines.
3. Parameters of lines used in technical drawing.
4. Sequence of dividing a segment into a given number of parts.
5. Sequence of dividing an angle into a given number of parts.
6. Sketch – rules of execution.
7. Types of axonometries established by the Unified System for Design Documentation.
8. Sequence of performing geometric figures in axonometry.
9. Sequence of performing a circle in axonometry.
10. Methods of shading in technical drawing.
11. Graphic representation of materials in sections.
12. Basic elements of a painting. Perspective apparatus.
13. The process of obtaining a perspective image.
14. Construction of a perspective image of faceted bodies.
15. Construction of a perspective image of round bodies.

16. Perspective scales.
17. Methods of constructing perspective images (combining the subject plane with the painting)
18. Theory of constructing shadows in perspective from natural and artificial light sources.
19. Theory of constructing mirror reflection in a flat mirror.
20. Perspective analysis of art paintings.

### **List of questions for the credit test with grade (8 term, Full-time education)**

1. Overview of the Blender open-source software interface and working with files.
2. Window system. The concept of screens and scenes.
3. Objects in Blender. Orientation in 3D space.
4. Basic manipulation of objects.
5. Simple modeling with Mesh.
6. Primitives and their structure.
7. Basic editing tools.
8. Curves, NURBS surfaces.
9. Deformation of objects using a curve.
10. Working with text.
11. Creating and setting up a material. Basic color and reflection.
12. Creating and setting up textures. Applying a texture to an object.
13. Modeling pile structures.
14. Creating fabric.
15. Overview of Blender's capabilities for creating physical properties of objects.
16. Light sources in Blender. The sun and the atmosphere.
17. Working with the camera in Blender.
18. Creating environment effects.
19. Capabilities of the rendering system in Blender.
20. Artistic render. Photorealistic render.

## **IV. LIST OF REFERENCES REQUIRED FOR MASTERING THE DISCIPLINE**

### **4.1. Main literature**

1. Aksenova, N. A. Computer graphics / N. A. Aksenova, A. V. Voruev, O. M. Demidenko. - Gomel: F. Skorina GSU, 2023. - 130 p. - ISBN 978-985-577-917-0. - Text: electronic // Lan: electronic library system. - URL: <https://e.lanbook.com/book/329723> (date of access: 05 April 2024). - Access mode: for authorized users.
2. Konstantinov, A. V. Technical drawing: [16+] / A. V. Konstantinov. - Moscow: Vlados, 2019. - 169 p.: ill., diagram. - (Fine Arts). - Access mode: by subscription. - URL: <https://biblioclub.ru/index.php?page=book&id=701475> (date of access: 05 April 2024). - Bibliography in the book. - ISBN 978-5-907101-56-2. - Text: electronic.
3. Lisyak, V. V. Fundamentals of Computer Graphics: 3D Modeling and 3D Printing / V. V. Lisyak; Southern Federal University. - Rostov-on-Don; Taganrog: Southern Federal University, 2021. -- 109 p.: ill., table, diagram. - Access mode: by subscription. - URL:

<https://biblioclub.ru/index.php?page=book&id=683948> (date of access: 05 April 2024).  
- Bibliography: pp. 103-106. - ISBN 978-5-9275-3825-6. - Text: electronic.

4. Shelestovskaya, V. A. Styles in graphic design [16+] / V. A. Shelestovskaya, G. S. Eliseenko; Kemerovo State Institute of Culture, Faculty of Visual Arts, Department of Design. - Kemerovo: Kemerovo State Institute of Culture (KemGIK), 2022. - 140 p.: ill., table. - Access mode: by subscription. - URL: <https://biblioclub.ru/index.php?page=book&id=701078> (date of access: 05 April 2024). - Bibliography: pp. 117-121. - ISBN 978-5-8154-0641-4. - Text: electronic.

#### 4.2. Additional literature

1. Grigorieva, M. B. Vector graphics and design in printing: a teaching aid / M. B. Grigorieva, V. A. Khlevnoy. - Simferopol: KIPU, 2023. - 204 p. - ISBN 978-5-6050673-7-5. - Text: electronic // Lan: electronic library system. - URL: <https://e.lanbook.com/book/387569> (date of access: 05 April 2024). - Access mode: for authorized users.
2. Kolesnichenko, N. M. Engineering and computer graphics: a tutorial: [12+] / N. M. Kolesnichenko, N. N. Chernyaeva. - 2nd ed. - Moscow; Vologda: In-fra-Engineering, 2021. -- 236 p.: ill., table., diagram., graph. - Access mode: by subscription. - URL: <https://biblioclub.ru/index.php?page=book&id=617445> (date of access: 05 April 2024). - Bibliography in the book. - ISBN 978-5-9729-0670-3. - Text: electronic.
3. Koryakina, G. M. Special drawing: methodology of project activity in design: [16+] / G. M. Koryakina, Yu. O. Shireeva; Lipetsk State Pedagogical University named after P. P. Semenov-Tyan-Shansky. - Lipetsk: Lipetsk State Pedagogical University named after P. P. Semenov-Tyan-Shansky, 2022. - 105 p.: ill. - Access mode: by subscription. - URL: <https://biblioclub.ru/index.php?page=book&id=700488> (date of access: 05 April 2024). - Bibliography in the book. - ISBN 978-5-907655-12-6. - Text: electronic.
4. Mirkhasanov, R. F. Descriptive Geometry, Perspective and Drawing: a tutorial: [12+] / R. F. Mirkhasanov, Ya. D. Ulyanova. - Moscow: Direct-Media, 2023. - 204 p.: ill. Access mode: by subscription. - URL: <https://biblioclub.ru/index.php?page=book&id=697804> (date of access: 05 April 2024). - ISBN 978-5-4499-3362-1. - DOI 10.23681/697804. - Text: electronic.
5. Shuldova, S.G. Computer graphics: a tutorial / S.G. Shuldova. - Minsk: RIPO, 2020. - 301 p.: ill., table. - Access mode: by subscription. - URL: <https://biblioclub.ru/index.php?page=book&id=599804> (date of access: 05 April 2024). - Bibliography in the book. - ISBN 978-985-503-987-8. - Text: electronic.

### V. LIST OF RESOURCES OF THE INFORMATION AND TELECOMMUNICATION NETWORK "INTERNET" REQUIRED FOR MASTERING THE DISCIPLINE

№	Link to information resource	Name of the development in electronic form	Availability
1.	<a href="http://edu.ru/">http://edu.ru/</a>	<b>Russian Education: Federal Portal.</b> Includes links to portals and websites of educational in-	Free access

		stitutions; state educational standards; regulatory documents; catalog of excursions and educational programs.	
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## **VI. MODERN PROFESSIONAL DATABASES AND INFORMATION REFERENCE SYSTEMS**

1.	<a href="http://www.biblioclub.ru">http://www.biblioclub.ru</a>	Electronic library system (ELS) University library online	Registration via the university computer. In the future, unlimited individual access is provided from any point where there is access to the Internet.
2.	<a href="https://e.lanbook.com/">https://e.lanbook.com/</a>	Electronic library system (ELS) Lan	Registration via the university computer. In the future, unlimited individual access is provided from any point where there is access to the Internet.

## **VII. LICENSED AND FREELY DISTRIBUTABLE SOFTWARE**

The following licensed and freely distributed software is used in the implementation of the academic discipline:

- Microsoft Windows;
- Microsoft Office;
- LibreOffice;
- Photoshop;
- Corel Draw;
- Blender and others.

## **VIII. EQUIPMENT AND TECHNICAL TEACHING AIDS REQUIRED FOR THE IMPLEMENTATION OF THE EDUCATIONAL PROCESS IN THE DISCIPLINE**

Classes are held in classrooms equipped with specialized furniture, including stationary or portable technical teaching aids (projector, screen, computer/laptop). Laboratory works are held in specialized classrooms equipped with personal computers with licensed and freely distributed software installed and the ability to connect to the Internet.

Independent work is carried out in rooms equipped with computers with the ability to connect to the Internet and provide access to the electronic information and educational environment of the university.