Ministry of Education and Science of the Republic of Kazakhstan

Buketov University

Faculty of Mathematics and Information Technologies

Department of applied mathematics and informatics

SYLLABUS

Multimedia technology and computer graphics

for specialty: 6B01505 - Informatics

course: 3
term: 5

Karaganda 2020

Compiler: Samoilova Irina,
Senior Lecturer

The curriculum is intended for studying general information on the course "Multimedia technology and computer graphics". This discipline is designed to study the basic concepts of graphic information and multimedia technologies. The curriculum can be used in the preparation and performance of diploma thesis on specialty. Discipline belongs to the profile disciplines of the component in choosing the working curriculum.

Syllabus on discipline «Multimedia technology and computer graphics» for specialty «6B01505 - Informatics» / *Compiler:* Samoilova I. – Karaganda: Publishing house of the University, 2020, 32 p.

1. The Working full-time training program

The duration of study	Year	Term	Credits	Lectures	Seminars	Labs	IWGT	IWS	Total	Form of the control
4	3	5	5	15	45		15	70	150	Test

№	The name of the topic	Lectures	Seminars	IWGT	IWS
1.	Review of multimedia technology and computer graphics and animation programs	1	1	1	
2.	Color palettes and color models	1	2		
3.	Corel Draw Editor	3	12	5	25
4.	PhotoShop Editor	3	9	5	25
5.	Composition and structure of multimedia technologies. Graphic representation of information in electronic educational resources	3	6	3	20
6.	Use of multimedia resources in the educational process	2	6	1	
7.	Classification of tools for creating multimedia educational resources	2	9	1	
	Total	15	45	15	70

2. Information about teachers

Samoilova Irina – irinasam2005@mail.ru.

Buketov University, 2 Building, Department of Mathematics and Information Technologies, 321 room. The residence time in the department - according to the schedule

3. Prerequisites

Information and communication technologies, Professionally oriented foreign language, Computer technologies of three-dimensional graphics and animation, Computer modeling.

4. Postrequisites

Methods of teaching computer science, Innovative technologies in organizing the educational process at school, Platforms and services for distance learning.

Result of training:

Knowledge and understanding: features of the use of computer graphics and multimedia in the educational process, current trends in the development of multimedia technologies.

Application of knowledge and understanding: select the necessary multimedia devices and technologies to solve a specific educational problem.

Formation of judgments: be able to defend your point of view, justify the choice of means of creating a multimedia product.

Communication skills: creative thinking skills and a creative approach when developing multimedia products.

Learning skills: mastery of modern computer graphics and multimedia software and hardware.

5. Short description of discipline

The purpose of the discipline «Мультимедийные технологии и компьютерная графика (на английском языке) » is to develop the skills to apply the fundamental principles of developing graphic and multimedia systems in the professional activities of a teacher.

6. Schedule for implementing and handing in the tasks on the discipline

	The types	The purpose and content of tasks	The reference to a list of recommended literature	The form of the control (according to the rating scale)	The points (according to the rating scale)	The reporting form	Completion Dates
1	Control work	Control of knowledge on the topic 3	p.7	CC 1	50-100	Paperwork	4 week
2	Independent work	Control of knowledge on the topic 6	p.7	CC 2	50-100	Paperwork	8 week
3	Control work	Control of knowledge on the topic 11	p.7	CC 3	50-100	Paperwork	13week

4	Independent work	Control of knowledge on the topic 14	p.7	CC 4	50-100	Paperwork	14 week
5	Activity	Systematic verification of mastering the material	p.7	CC 5	50-100	an oral response	15 week

7. Map of educational and methodological provision of discipline

№ №	Name of textbooks, manuals used at the rate	Number of textbooks and manuals in the Scientific Library of KSU
	1. Basic literature	
1.	Information-communication Technology: educational manual / B.A. Urmashev; Al-Farabi Kazakh national university. - Almaty: Qazaq University, 2017. - 335 p.;	7
2.	Технология разработки и использования мультимедийной учебной презентации: учеб. пособие / Е. А.Спирина. - Алматы : CyberSmith, 2017. - 143 с.	7
3.	Summary of lectures on course "Engineering and computer graphics" : educational and methodological assistance / N. N. Tairova ; Al-Farabi Kazakh nationaal university. - Almaty : Qazaq University, 2018. - 217 p.	11
4.	Developing Business Applications for the Web : with HDML, CSS, JSP, PHP, ASP.NET, and JavaScript / L. Ubelhor, C. Hur. - Boise : MC PRESS, 2017. - 556 p.	1
5.	Технология создания мультимедиа средства на примере разработки электронного приложения к квесту по физике / Е. Д. Запрудская, В. В. Дубицкая Л.В. - Текст : непосредственный // Физика в школе . - 2019. - №4. - С. 26-30.	1
6.	Информационные технологии : задачник: учеб. пособие / С. В. Синаторов. - М. : Альфа-М: ИНФРА-М, 2015. - 254 с.	3
7.	Большая книга компьютера : научное издание / В. Леонов. - М. : ЭКСМО, 2015. - 400 с.	1
8.	Новые информационные технологии: 30 уроков по информатике : учебник / Е. К. Балапанов, Б. Бурибаев, А. Б. Даулеткулов. - 6-е изд., доп. - Алматы : New book, 2018. - 337 с.	4
9.	Инженерная и компьютерная графика : учебник / Н. С. Кувшинов, Т. Н. Скоцкая. - М. : КНОРУС, 2019. - 233 с.	2

10.	3D-графика и видео в Photoshop CS4 Extended : научное издание / Елена Яковлева. - СПб. : БХВ-Петербург, 2013. - 266 с.	1
11.	Подарки своими руками с CorelDraw и Photoshop : учебное пособие / В.В. Макарова. - СПб. : БХВ-Петербург, 2013. - 192 с.	1
12.	Information and Communication Technologies : учебно-методическое пособие / Е. В. Шевчук , А. В. Шпак, Н. С. Кольева. - Алматы : Эпиграф, 2016. - 107 р.	5
	2. Additional literature	
13.	Web technologies : tutorial / Ye. A. Spirina ; Ministry of Education and Science of the Republic of Kazakhstan. - [S. l.] : Karagandy University of the hame of acad.E.A.Buketov, 2021. - 128 p.	29
14.	Information and Communication Technologies = Информационно-коммуникационные технологии : textbook: In 2 parts / D. Shynybekov [et al.]. - 1 st edition. - Almaty : IITU, 2017 - . Pt.2. - 2017. - 622 p.	12
15.	Information and Communication Technologies : учебно-методическое пособие / Е. В. Шевчук . - Алматы : CyberSmith, 2017. - 107 р.	3
16.	Технология разработки и использования мультимедийной учебной презентации : [Электронный ресурс] : учеб. пособие / Е. А. Спирина. - Электрон. текстовые дан.(9,50 Мб). - Алматы : Эверо, 2016. - 1 эл. опт. диск (CD-ROM).	
17.	Информационные системы и технологии : учеб. пособие / Г. Д. Жангисина. - Алматы : Эпиграф, 2016. - 210 с.	15
	2.1. Список периодических изданий	
18.	Вестник КарГУ. Серия Математика	
	2.2. Список источников на электронных носителях	
19.	Summary of lectures on course "Engineering and computer graphics" : educational and methodological assistance / N. N. Tairova ; Al-Farabi Kazakh nationaal university. - Almaty : Qazaq University, 2018. - 217 p.	1
20.	Мультимедийная презентация по дисциплине "Графические редакторы" : [: Мультимедиа : Электронный ресурс] : цикл - профилирующие дисциплины, компонент - по выбору, вид занятий - лекция: спец. 5В060200 "Информатика" / Л. В. Ус	
21.	Мультимедийная презентация по дисциплине "Компьютерные технологии трехмерной графики и анимации" : [: Мультимедиа : Электронный ресурс] : цикл - профилирующие дисциплины: компонент - по выбору: вид занятия - лекции; спец. 5В011100 "Информатика" / И. А. Самойлова ; Карагандинский гос.ун-т. - Электрон. текстовые дан. (7,79Мб). - Караганда : [б. и.], 2017. - 5 лекций. - Б. ц.	
22.	Компьютерная графика : [Электронный ресурс] : учебно-методический комплекс для специальности: 5В060200-«Информатика»: 3 курс, 5 семестр / сост. И.А. Самойлова. -	

	Электрон. текстовые дан. (3,23Мб). - Караганда : Изд-во КарГУ, 2018. - 36 с. - Б. ц.	
2.3. Интернет источники		
23.	https://www.coreldraw.com/en/product/coreldraw/	
24.	https://www.adobe.com/cis_ru/products/photoshop.html	
25.	https://www.techsmith.com/video-editor.html	
26.	https://www.animaker.ru/features	

8. The lecture complex (abstracts of lectures)

Topic 1 Review of Multimedia technology and computer graphics and animation programs

Multimedia technology and computer graphics appeared in the 1960s. This day, it is customary to use Multimedia technology and computer graphics (CG) and computer animation (CA) terms. The concept of Multimedia technology and computer graphics includes all kinds of work with static images, computer animation with dynamically changing images. Combine the graphics and animation gives the opportunity to abbreviate CGaA. The dot graph operates with pixels. The pixel has a certain color value and is uniquely located in the grid of the bitmap. Vector graphics operates with mathematical objects.

The structure of images can be raster and vector-based. When editing a bitmap, the color of the pixels changes. Color change entails a change in shape. Color is primary, the form is a derivative of color. In the pure form, without a color, the form does not exist.

When editing vector graphics, the shape of the object changes first. Color plays a secondary role. Color and shape are independent of each other. In its pure form, without form, color does not exist.

Review of Multimedia technology and computer graphics and animation programs. According to their purpose, the tools of CGaA are divided into packages: Multimedia technology and computer graphics for printing (Adobe Photoshop, Adobe Illustrator, Corel Draw); programs of two-dimensional computer art (Painter, FreeHand); presentation packages (Freelance Graphics, Harvard Graphics, PowerPoint); Two-dimensional animation programs used to create dynamic images and special effects in movies (Animator Pro); programs for 2D and 3D modeling, applicable for design and

engineering (AutoCAD); packages of three-dimensional animation used to create advertising and music clips and movies (3D Studio and 3D Studio MAX); complexes for image processing necessary for applying animation special effects to video recording (Adobe Premier); programs for scientific visualization (Surfer, Grapher and MapViewer).

The file format determines how to store the information contained therein and is used so that the file can be opened and saved. For example, if you save a file in Corel Draw, the program saves by default the file with the filename extension .cdr.

Main graphic file formats:

.jpg is a common and versatile format. To store an image, the JPEG format uses a strong compression algorithm with loss of information. The format does not allow the use of animation and transparency. The JPEG format is used to store high-quality photos.

.bmp is the most cumbersome type of poorly compressible raster graphics. As a rule, the picture in .bmp is an order of magnitude larger than the similar image in .jpg with the quality of the apparent human eye quite identical.

.gif (Graphic Interchange Format) - a format originally intended "under the Web" - combines the ease and quality. GIFs have a limit of 256 colors.

.PNG Portable Network Graphic is a graphical format introduced to replace the GIF format after the patent problems have arisen with GIF.

Literature: [1] - [5], [6] - [16].

Topic 2 Color palettes and color models

Each pixel in the bitmap contains information about the color. Any vector object also contains information about the color of its outline and the shaded area. The information can take from one to thirty-two bits, depending on the color depth. If we work with black and white images, then the color is encoded by zero or one. For drawings containing 256 colors, you can number all the colors. But for images in true color, containing millions of different shades, simple numbering does not fit. For them, several models of color representation have been developed, which help to uniquely identify any from-the-shade. The color model defines the way the colors used

in the image are created. In total, three basic color models and a number of their modifications have been developed.

Sunlight can be decomposed into separate color components. By mixing these three colors, you can get a variety of colors and their shades. This is the basis for the RGB color representation model, named after the initial letters of its colors: Red - Red, Green - Green, Blue - Blue. T Color palettes and color models. These colors are called primary colors. The model is called additive (addition). by adding color you can get any other color. The RGB model is used in PC monitors. When encoding a point's color with three bytes, the first byte is highlighted with a red component, the second by a green one, and the third by a blue one.

Printers work with other primary colors and use a subtractive model (subtraction). Most of the colors that we see in the world around us are the result of reflection and absorption of light. The CMYK and CMY models are built on the color subtraction effect: the primary colors Cyan - blue, Magenta - magenta (Fuchsin), Yellow - yellow, Black - black. In the variety of this model, called CMY, there is no black color, but it is used much less often. Choice of colors for the model is not accidental, they are closely related to the colors of the RGB model. Additional color - the difference between white and data, for example, yellow = white - blue. Therefore, CMY is called a subtractive color mixing system.

The HSV color model is based on the perception of color by humans. Any color in the model is described by three numbers: color, saturation, brightness. The color in this model is independent of the technical means used.

Literature: [1] - [5], [6] - [16].

Topic 3 Corel Draw Editor

The basic concept of any editor of vector graphics is the concept of an object. Creating an image consists of creating objects, editing, and arranging them. The created object is corrected by adding, deleting and moving the contour nodes. After the required shape of the object is created, the color of the contour is set and the object is replaced.

To change the color of the outline and fill the object, use the color palette located on the right side of the screen. In each cell in the

palette, the top cell means no color. If the object does not have a fill, then there is no fill color, then the object will be transparent, and under it you can see other objects. The fill in white color makes the object opaque.

Formation of objects from several others. In the graphical editor CorelDraw there are three commands for the formation of objects from others: Weld, Trim, Intersect. The operations are performed with the help of the buttons "Quik Intersect", "Quik Trim" and "Quik Weld" located in the properties panel. You need to select the objects above which you want to perform the forming operation, and then click the corresponding button.

In CorelDraw, there is a possibility of the appearance of text objects: figured (Artistic) and ordinary (Paragraph) text. Figure text is a graphic object. Normal text - the weight of the text in the frame, inserted in the picture. You can change the borders of the frame of ordinary text or give it a different form, but inside the text will be located exactly as in any text editor. Text is used to enter a small text. Normal text is designed to enter large amounts of textual information and is often used when creating promotional flyers.

In CorelDraw, there are tools for automatically building effects, simulating the volume and depth of the scene. First of all, they include the transformation of perspectives. Conversion perspective, distorts the shape according to the selected perspective scheme.

To build the shadows cast by objects on a plane, you can use the method of combining a group of objects that represent a shape, then changing the fill and the shape of the resulting object (for example, using the perspective effect), but you can use a special tool to create falling shadows.

The extrusion effect allows us to construct in the figure the projection of a generalized cylinder - a body formed by moving a plane figure in space in a direction perpendicular to its plane. CorelDraw automatically performs a parallel or perspective projection of the figure and builds both images of the lateral surfaces of the generalized cylinder, and a black and white picture on them.

In the terminology of CorelDraw, a perspective is a pre-formation that distorts the shape of an object in such a way as to imitate a single-point or two-point perspective. By its results, the transformation of the perspective is equivalent to encapsulating the object in a quadrangular

envelope and then moving its nodes. If the parallelism of the pair of opposite sides of the envelope is broken, the continuations of the initially parallel segments will intersect at a point called the vanishing point. When the parallelism of both pairs of opposing sides of the envelope is broken, there are two vanishing points. Accordingly, there are particular cases of perspective: one-point and two-point.

A step-by-step transition to CorelDraw is a composite object that includes the initial control object, the final control object, and the ordered collection of intermediate objects. The form of intermediate objects is chosen so that their sequence mimics the smooth transformation of the initial control object into the final one. The fill and stroke attributes of the contour of intermediate objects also smoothly change. In a basic step-by-step transition, intermediate objects are evenly distributed along a straight line connecting the centers of control objects. During the subsequent setup, you can opt out of the uniformity of the distribution by specifying a particular acceleration value. Acceleration is the replacement of the proportionality coefficient, which is used to calculate the values of the control parameters of the intermediate object, depending on the number of this object. Most often, acceleration is used to change the location or rate of change in the filling of intermediate objects of a step transition.

Halo is a collection of closed curves that are equidistant to the control object, that is, spaced at the same distance from it. The colors of the filling and obvodki control object smoothly flow into the colors zavivki and strokes, set for the last of the objects of the halo. The number of subordinate objects in the halo is specified explicitly or is determined automatically. Halos are in many respects similar to step-by-step transitions, but in halo the second controlling object (similar to the first) is only implied. As the managing object of the aureole, only single objects can act, both closed and non-closed.

Literature: [1] - [5], [6] - [16] , [23].

Topic 4 Raster editor PhotoShop

All Photoshop tools can be conditionally divided into four groups:

- tools for drawing and painting;
- Tools for highlighting and moving selected areas;

- tools for editing and retouching images;
- Text tools.

The Attribute panel for any active tool displays all its settings. The palettes represent the windows on the right of the program interface, in which some of the Photoshop controls are grouped. Palettes can be fixed, minimized in icons or transferred outside the window. Photoshop contains several such palettes. Palettes are provided with tabs (tabs).

The Color palette displays the current foreground and background colors, which can be edited by moving the sliders of the corresponding components of the color model. The Swatches tab of this palette contains a set of available colors and allows you to add new ones to the set and delete unnecessary colors. The Styles tab contains options for working area fills.

In the History palette, the program captures every step of the image editing. Here you can see all the operations you performed with the tools and commands of the graphic editor.

The Layers palette lists all image layers, starting from the top and ending with the background image. This palette is used to determine the parameters of the layers.

The Channels tab of this palette is used to create and edit channels. The Paths tab contains a list of all the contours created by the user.

Filters are small programs that perform a pre-established sequence of commands. They automatically calculate the values and characteristics of each pixel in the image and then modify them according to the new values according to a certain algorithm. For example, when applied to an image of the motion blur filter (Motion Blur), the values of all pixels in the image are analyzed and these values are shifted in a certain direction to create the illusion of blurring the image as a result of its movement.

Font and text are fundamental concepts for any designer work. Font in the broadest sense of the word is a means of conveying information. In a more narrow aspect - the element of the design of the document. However, the font, by its nature, is not only an ordered graphic form of a definite system of writing, but also a means of aesthetic and artistic design of the information carrier. It is this function that is of interest from the point of view of design.

Computer fonts are divided into two main types according to the method of constructing symbols: raster and vector. A raster font is a collection of points that form symbols (ie, letters are described as collections of points). In this regard, there is no effective way to change font sizes and it is necessary to store individual kits for each pin. Attempting to scale such a font with a noticeable zoom factor leads to the appearance of a so-called ladder (step) effect when the symbols appear to be created from large blocks without smoothing the joints.

As mentioned above, bitmap fonts (* .FON) are bitmaps, well-suited for quick display. Usually these are business fonts, which the computer uses for its own needs. As part of Windows, by default, five basic bitmap fonts are delivered: MS Serif, MS Sans Serif, Courier, Small Fonts and Symbol. If desired, their number can be increased by installing additional fon-fonts.

Vector True Type fonts (* .TTF) fonts are stored as mathematical lines (vectors), and this information Windows can use to build a font of arbitrary scale. Even being enlarged, many times, vector fonts do not lose their appearance and remain smooth.

All computer fonts can be conditionally divided into 4 groups: serif fonts, serif sans serif fonts, decorative fonts, including scripts, symbol fonts (symbol).

To enter text, use the special tool Text (Text), activated by pressing the appropriate button in the toolbar or by pressing the T key. However, in most cases, the work with the inscriptions consists not only of their direct input, but also of specifying the parameters (attributes) of the input you text. For these purposes, the toolbar of the Text tool is used.

Literature: [1] - [5], [6] - [16] , [24].

Topic 5 Composition and structure of multimedia technologies. Graphic representation of information in electronic educational resources

Multimedia is a type of medium that allows information to be easily transferred from one location to another. Multimedia is the presentation of text, pictures, audio, and video with links and tools that allow the user to navigate, engage, create, and communicate using a computer. Multimedia refers to the computer-assisted integration of

text, drawings, still and moving images (videos) graphics, audio, animation, and any other media in which any type of information can be expressed, stored, communicated, and processed digitally.

Categories of Multimedia

1. Linear Multimedia. It is also called Non-interactive multimedia. In the case of linear multimedia, the end-user cannot control the content of the application. It has literally no interactivity of any kind. Some multimedia projects like movies in which material is thrown in a linear fashion from beginning to end. A linear multimedia application lacks all the features with the help of which, a user can interact with the application such as the ability to choose different options, click on icons, control the flow of the media, or change the pace at which the media is displayed. Linear multimedia works very well for providing information to a large group of people such as at training sessions, seminars, workplace meetings, etc.

2. Non-Linear Multimedia. In Non-Linear multimedia, the end-user is allowed the navigational control to rove through multimedia content at his own desire. The user can control the access of the application. Non-linear offers user interactivity to control the movement of data. For example computer games, websites, self-paced computer-based training packages, etc.

Today the term "multimedia" is used quite widely, so it is important to understand what exactly it refers to. For example, a well-known multimedia player is called multimedia because it can play photographs, videos, sound recordings, and text in turn. But at the same time, every product currently being played is "single-media" ("dual-media" can only be called a voice-over video).

The same can be said about a "multimedia collection": taken together, the collection is multimedia, but each individual element used is not multimedia.

When we talk about multimedia electronic educational resources, we mean the possibility of simultaneous reproduction on a computer screen and in sound of a certain set of objects presented in various ways. Of course, we are not talking about meaningless confusion; all represented objects are logically connected, subordinated to a certain didactic idea, and a change in one of them causes corresponding changes in the others. Such a coherent collection of objects can rightly be called a "scene." The use of the theatrical term is quite justified,

since most often fragments of real or imaginary reality are presented in multimedia electronic educational resources.

The degree of adequacy of the representation of a fragment of the real world determines the quality of the multimedia product. The highest expression is "virtual reality," which uses multimedia components of the highest quality for human perception: three-dimensional visuals and stereo sound.

Literature: [1] - [5], [6] - [16], [25].

Topic 6 Use of multimedia resources in the educational process

The use of multimedia technologies opens up new opportunities in organizing the educational process, as well as in developing the creative abilities of students. Through the joint efforts of educators, scientists, programmers, producers of multimedia teaching aids and practicing teachers, a new information educational environment is being created, in which the integration of educational and information approaches to the content of education, teaching methods and technologies becomes decisive.

The use of multimedia technologies in education has the following advantages compared to traditional education:

- allows the use of color graphics, animation, sound, hypertext;
- allows for constant updating;
- allows the possibility of placing interactive web elements in it, for example, tests or a workbook;
- allows for non-linear flow of material due to multiple hyperlinks.

Thus, various aspects of the use of multimedia in education are currently being actively studied, the technical and psychological-pedagogical features of multimedia technologies are highlighted, and the need for their targeted and productive use in the educational process of secondary and higher schools is emphasized. Most teachers and psychologists note that modern information technologies, including multimedia, provide students with access to non-traditional sources of information, allow them to implement fundamentally new forms and methods of teaching using conceptual and mathematical modeling of phenomena and processes that can improve the effectiveness of learning.

Multimedia in education allows us to connect a maximum of human channels to the perception of information, since we perceive more than 70% of information through vision, and less than 30% through hearing. Multimedia allows you to create an information-rich immersion environment for participants in the educational process, using text and graphic data, video, audio, volumetric modeling capabilities and interactive tools.

Literature: [1] - [5], [6] - [16], [25].

Topic 7 Classification of tools for creating multimedia educational resources

To create multimedia digital educational resources, the capabilities of the PowerPoint presentation editor are used.

Based on slide ppt presentations, you can conduct online consultations and demonstration distance lessons in a webinar room or on Skype. PowerPoint slides are appropriate for focusing attention on the most important places and tasks of the lesson. With their help, the teacher provides live material for independent work on developing oral and written competencies in a foreign language, and in response, the student is invited to record his speech in Audacity and send it to Moodle.

To create slide presentations, you can use a tool like Canva. This is a free graphics editor that is great for both design beginners and seasoned professionals. The service allows you to quickly and easily create cool posts for social networks, creative videos, presentations, Instagram Stories and other visual materials.

Currently, one of the effective ways to digitalize educational content is videos: promotional, instructive, lesson, thematic (news and story), educational - on the linguistic, thematic, situational and communicative component of the training course.

A promotional video is created to introduce and promote the distance learning course to target students. Promotional video recording is carried out in a studio using specialized equipment. Instructional videos are created based on pre-prepared 10–12 multimedia slides that describe the algorithm for completing a series of lessons as part of a weekly training load. Students see and hear explanations; Links to text and video sources, pronunciation samples of thematic and text vocabulary are provided.

An instructional video should not be boring or drawn out, otherwise the student will spend more time and effort watching the instructions than learning. Typically, instructional videos are created without student participation.

However, if a video was taken of a remote work or demonstration lesson with a student, then such the video is welcomed in the image policy of the educational institution and can participate in competitions of pedagogical ideas.

Such a video fragment can be created by screencasting, i.e. screen recordings using the Bandicam application for shooting, Freemake Video Converter for editing and editing.

To create a video capture of a training video, you can use the Free Cam tool, and then process it using, for example, Camtasia Studio.

Animaker is perfect for creating animated videos. It is the perfect creative tool to create, edit and post video content. Animaker's features are powered by a powerful HTML5 module that ensures smooth performance in optimized browsers. A variety of professional templates are ready to give you a powerful creative boost to create your own videos. Animaker offers the largest collection of animated characters, settings, BGs, icons, images, videos, etc.

Literature: [1] - [5], [6] - [16], [26].

9. Plans of seminars

Topic 1 Review of Multimedia technology and computer graphics and animation programs

Questions:

1. History of the development of the term multimedia
2. What precedes the emergence of multimedia technologies?
3. What is the difference between hypermedia and multimedia?

Task.

1. Find information about a hypothetical prototype hypertext system described by Vannevar Bush in the essay "As We May Think," published in The Atlantic in 1945.
2. Watch the video «Memex animation - Vannevar Bush's diagrams made real» (in English):

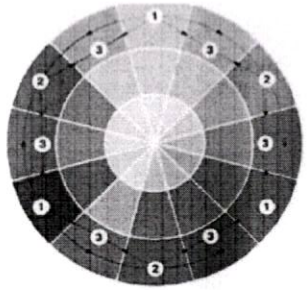
https://www.youtube.com/watch?v=c539cK58ees&t=32s

Topic 2 Color palettes and color models

Questions:

1. The concept of light and color.
2. The human visual apparatus for color perception.
3. The concept of color model and mode.
4. Types of color models (RGB, CMYK, HSB, Lab), their advantages and disadvantages.
5. Grassmann's laws.
6. Color coding.

Task:



Conduct a comparative analysis of the following color representations in a computer:

1. Itten's color circle
2. Isaac Newton's color wheel. Newton's color triad.
3. Goethe's color circle.
4. Oswald's color wheel.

Literature: [1] - [5], [16] - [24].

Topic 3 Corel Draw Editor

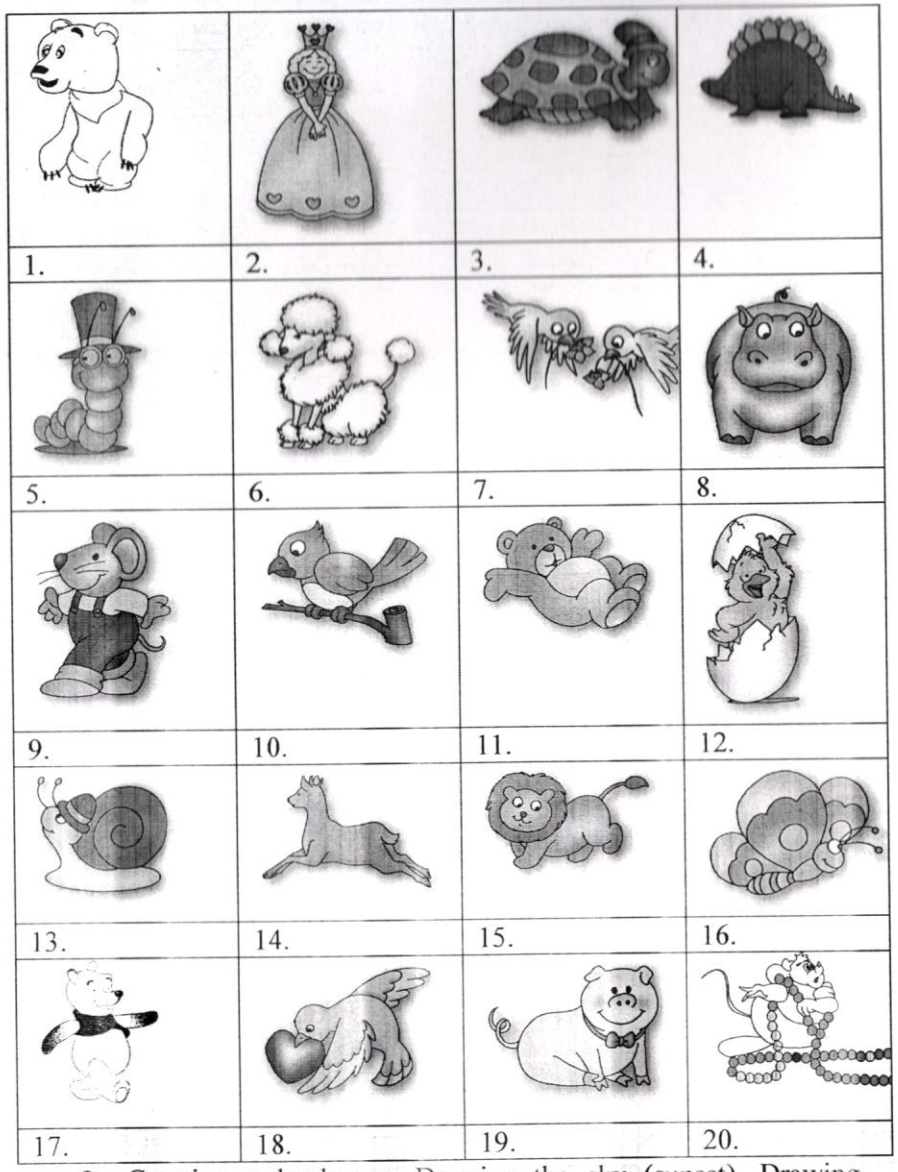
Questions:

1. Which of the listed programs are raster programs Adobe Illustrator, Adobe Photoshop, CorelDRAW, Corel PHOTO-PAINT, Macromedia FreeHand, MS Paint?
2. What model is called additive?
3. What are the models of color formation?
4. Where are the RGB, CMY models used?
5. What formats are related to vector graphics?

6. What are the simplest objects?
7. What kinds of fillings exist. Describe.
8. Use the Transform fill with object check box.
9. Which tool can draw a line?
10. What object classes exist in CorelDraw? What is in the program under the curves? With what tools can curves be drawn and in what ways are they obtained?
11. What are the curves? List the main elements of the curves. What are control lines and control points? How to find them? What role do they play?
12. List the main types of nodes and their distinctive features. Can I change the type of nodes and how?
13. How can I change the relative position of objects?
14. What kinds of text exist in CorelDraw? What are their distinctive features, properties and purpose?
15. What tool is used to enter text? Tell me how to enter a fragment of a figurative text. What algorithm is used when entering plain text? Can I enter a fragment consisting of several paragraphs for the figure text? For a plain text? How can you distinguish the entered fragment of a figured text from a fragment of a simple text?
16. Can CorelDraw exchange text data with other programs? How to do this?
17. What is meant by formatting in computer design programs? List all possible tools for implementing these functions in CorelDraw.
18. What is the essence of working with new generation dockers, which include dockers for formatting characters and paragraphs?
19. List the main parameters of the symbols and how to change them.
20. Is it possible to place a fragment of a figured text in two columns? And in three columns? Is it always possible to place a fragment of plain text in several columns? How is this implemented?

Tasks:

1. Draw a fairy-tale character in accordance with the variant:



2. Creating a landscape. Drawing the sky (sunset). Drawing clouds with a grid fill.
3. Create a stylized business card with a computer theme.

4. Create, repeating fragments.
5. Building an octopus. Strengthen the effect of dimensionality.
6. Creating custom blanks using the example of a spruce branch.
7. Consider using the tools of a group of interactive effects on the example of creating a New Year's candle.
8. Imitation of the portrait under the glass.

Literature: [1] - [5], [6] - [16].

Topic 4 Raster editor PhotoShop

Questions:

1. What formats does Photoshop support?
2. Does the change in the order of the layers affect the result
3. List the main tools for drawing graphics editor Adobe Photoshop.
4. How to change the size and rigidity of the brush? How to change the shape of the brush? How to choose the color of drawing?
5. For what purposes are the layers used? How to create a new layer? How to delete an unnecessary layer? How to combine several layers with each other?
6. What part of the image is called a masked area?
7. Why is Photoshop using a variety of selection tools?
8. For selecting which parts of images it is convenient to use the tools of the Lasso group?
9. When do I use the Magic Wand tool?
10. How does the value of the Tolerance field of the Magic Wand tool affect the selection?
11. What operations can be performed on the boundary of the selected area?
12. What transformations can be performed on selected fragments of images?
13. Assignment:
14. Use the corrective layers to restore the old photo.

Tasks:

1. Crop the image. Selection of the specified area on the image. Perspective correction.
2. Working with layers. Blending modes.
3. Tools for drawing. Skin discoloration.

4. Resize the image. Removing the effect of red eyes.
5. Layer Styles. Drop on a piece of paper.
6. Photo retouching. Retouching Tools: Healing Brush, Spot Healing Brush, Clone Stamp, Patch
7. Retouch photos using History Brush.
8. Restore photos. Increase the contrast of the layer. Increase saturation.
9. Apply a filter to create a photo frame with filters.
10. Using filters. Turning a photo into a picture.
11. Image correction using the Liquify tool.
12. Creating a friendly cartoon using the tool Liquify.
13. Creating a 3D text effect
14. Create an animated avatar.

Literature: [1] - [5], [16] - [24].

Topic 5 Composition and structure of multimedia technologies. Graphic representation of information in electronic educational resources

Questions:

1. The role and place of multimedia technologies in modern information technologies. Classification of multimedia technologies.
2. Areas of application and importance of multimedia applications for solving socio-economic problems. Use of multimedia in business and e-commerce, presentation, training, self-education, advertising, media.
3. Modern trends in the use of multimedia technologies in the creation of integrated information systems.

Tasks:

Explore the following five programs that can help you create engaging multimedia presentations.

1. Software #1: Visme.

The first software on the list is Visme. Our editor's diverse set of integrations is the right combination to create an impressive multimedia presentation.

2. Software #2: Wistia

Wistia is video hosting, administration and marketing software for businesses seeking greater control over their video content.

Embedded videos are one of the fastest ways to create a multimedia presentation. If you create your presentation in Visme, you can easily add Wistia videos to your slides.

You can also add videos from YouTube, Vimeo and Vidyard. Check out the full list of Visme integrations here.

3. Software #3: Typeform

Multimedia presentations with polls add an unprecedented level of interactivity. Typeform or Jotform integrations add surveys to informative presentations or market research projects.

When you include a survey in a presentation, you should share it as a link or embed it on your website. This way, your audience can enter answers right inside the slide rather than opening a separate window.

4. Software #4: Loom

Recording video in Loom and embedding it into slides can be a great alternative for in-person presentations. Provide training to your audience, give a brief overview of the topic, introduce your company and services, or simply introduce yourself. Loom videos offer plenty of opportunities to make your presentation more interactive.

5. Software #5: Google Maps

Add maps to your multimedia presentations to visualize geographic data or location information. Visme offers two options for creating maps: Map Engine and integration with Google Maps. Map Engine lets you create custom color-coded maps with interactive pop-ups; they completely match the design of your project. Import map data from a Google spreadsheet or enter it manually.

Add a default Google navigation map. Enter specific location coordinates in the editable input field.

Literature: [1] - [5], [16] - [24].

Topic 6 Use of multimedia resources in the educational process

Questions:

1. What is multimedia in eLearning?
2. What role does multimedia learning play in the digital learning design process?
3. The importance of multimedia in digital learning
4. The benefits of including multimedia in eLearning

5. The future of multimedia in eLearning

Tasks.

Create a digital educational resource using multimedia technologies.

Use free screen recording software iSpring Free Cam. It helps you quickly create videos, edit them and post them on YouTube in one click. Completely in Russian, without advertising and watermarks (https://www.ispring.ru/ispring-free-cam).

Camtasia Studio is positioned as an excellent video editor. When downloading the program, the user can choose the mode that is relevant for their purposes by downloading a free trial version of the utility, the trial period of which is 1 month, or purchase a licensed version. The utility has different purposes: it can be used for editing amateur videos, creating professional digital video recordings, and for editing video tutorials, presentations and much more (ttps://www.techsmith.com/video-editor.html).

Literature: [1] - [5], [6] - [16], [25].

Topic 7 Classification of tools for creating multimedia educational resources

Questions:

1. Existing multimedia resources that you can reuse.
2. Creating your own multimedia resources.
3. Encouraging students to create multimedia resources.

Task.

Create a multimedia product using animaker studio (https://www.animaker.ru). Your product should contain educational content. This could be a lesson in programming, computer graphics or robotics.

With Animaker, users can add texts, images, photos and videos to their projects. The function of adding audio and sound effects is also available to make the video more interesting and attractive.

One of Animaker's unique tools is the ability to create characters using ready-made combinations of body parts. Users can choose different body types, faces, clothing and accessories for their characters, allowing them to create unique and original videos.

Animaker also provides the ability to add various effects and transitions between frames to add dynamics to your videos. Another

useful feature is the ability to add graphs and charts that will help you visualize your data and make your video more informative.

Literature: [1] - [5], [6] - [16] , [26].

10. Plan of labs

The laboratory works are not provided for in the plan.

11. Lessons plans as part of students' independent work under the guidance of a teacher

Topic 1 Review of Multimedia technology and computer graphics and animation programs

Questions:

1. Give the concept of "graphics", "Multimedia technology and computer graphics" and name the types of computer images.
2. Describe the bitmap and vector graphics.
3. How are raster images made? What are they made of? Give an example.
4. How can I calculate the amount of a file containing a black and white image?
5. What determines the quality of the bitmap image? What is a pixel?
6. What are the advantages and disadvantages of the raster image?

Tasks:

1. Conduct a comparative analysis of models: RGB; CMYK; CMY.
2. Conduct a comparative analysis of packages:
   - Paint; Photo Editor; ImageView, PSE;
   - Power Point;
   - Movie Maker, DVD Creator.

Literature: [1] - [5], [11] - [16].

Topic 3 Corel Draw Editor

Questions:

1. What object classes exist in CorelDRAW? What is in the program under the curves? With what tools can curves be drawn and in what ways are they obtained?
2. What are the curves? List the main elements of the curves. What are control lines and control points? How to find them? What role do they play?
3. List the main types of nodes and distinctive signs. Can I change the type of nodes and how?
4. What is the main element used for editing curves? What operations by means of the properties panel can be accessed in the editing mode of the nodes? Enumerate the basic operations for editing curves and describe the ways of their implementation.
5. How to split a contour into its component parts? What ways of connecting curves exist and how do they differ?
6. What types of lines can be drawn using the tools Bezier Tool (Bezier Curve) and Pen Tool (Pen)? Give the algorithm for creating smooth curves with these tools?
7. Can you use the Knife Toll, Eraser Tool and Smudge Brush tools? How to work with them and how can they be customized?
8. List the operations that are part of the Shaping group (Formation). Kakai toolkit is used to perform these operations? Give examples of use.
9. What commands are used when connecting and disconnecting objects? How do these operations differ from the operations of connecting and disconnecting circuits?
10. For what purposes is the CorelDRAW image editor used?
11. How can I change the size of an object?
12. How do I get a mirror image of an object?
13. How to implement a skew (rotation) of the object?
14. How can I change the thickness (color, style) of an object's contour?
15. How can I change the order of objects?
16. What means of working with color does CorelDRAW have? How to produce a uniform (gradient) fill of an object?
17. How can I arrange objects along a vertical or horizontal line, equidistant from each other or exactly in the center of the page?

Tasks:

1. Study the technology of building lines using the Bezier, Pen tool.

2. Build a closed curve ("phone") using the Bezier tool.

3. Building a bicycle.

4. Use the spray mode to add a background. Add your template.

5. The dark tomb.

6. Create a palm grove in CorelDraw.

7. Construction of the volcano.

8. Draw a ladybug.

9. The construction of a bouquet of asters.

10. Draw an elastic deformation of the balloon and apply an inscription on its surface in such a way that an illusion of dimensionality arises.

Literature: [1] - [5], [16]- [20].

Topic 4 PhotoShop Editor

Questions:

1. List the elements of the Photoshop graphic editor window.

2. How do I create and save a new document? What possibilities of preservation does Photoshop provide?

3. What image viewing modes does Photoshop provide?

4. What are the tools for Hand, Magnifier, Palette Navigator?

5. What is the purpose of the coordinate ruler, guide, grid?

6. How to measure distance, angles? What is the Info palette for?

Tasks

1. Selection of the whole layer

2. Selection of a rectangular or elliptical region

3. Create a selection area of any shape

4. Creating a selection in the form of a polygon

5. Selecting pixels according to their color

6. Highlighting with the Magnetic Lasso tool

7. Magnetic Lasso tool options panel

8. Selecting a region by color

9. Creating a selection area in the form of a strip

10. Inverting the selection

11. Add points to the selected area

12. Deleting points from the selected area

13. Selecting the intersection of two selected areas

14. Vignetting the image

15. Masking shapes using the Extract command

16. Changing portrait background

17. Vignetting the image

18. Change the shape of the selected area using the Quick Mask mode.

19. Create a quick mask without using a selection.

20. Sharpen and blur images

21. Cloning areas in one image

22. Using the Pattern Stamp Tool

23. Using the Healing Brush tool

24. Using the Patch Tool

25. Cloning of a fragment of one image with a transfer to another

26. Feathering the selection. Eliminating seams in a layer

27. Smoothing the border of the selected area

Literature: [1] - [5], [16]- [20].

Topic 5 Composition and structure of multimedia technologies. Graphic representation of information in electronic educational resources

Questions:

1. The role and place of multimedia technologies in modern information technologies. Classification of multimedia technologies.

2. Areas of application and importance of multimedia applications for solving socio-economic problems. Use of multimedia in business and e-commerce, presentation, training, self-education, advertising, media.

3. Modern trends in the use of multimedia technologies in the creation of integrated information systems.

Tasks:

Explore the following five programs that can help you create engaging multimedia presentations.

1. Visme.

2. Wistia

3. Typeform

4. Loom

5. Google Maps

Literature: [1] - [5], [16] - [24].

Topic 6 Use of multimedia resources in the educational process

Questions:

6. What is multimedia in eLearning?
7. What role does multimedia learning play in the digital learning design process?
8. The importance of multimedia in digital learning
9. The benefits of including multimedia in eLearning
10. The future of multimedia in eLearning

Tasks.

Create a multimedia presentation using Canva.

To create slide presentations, you can use a tool like Canva. This is a free graphics editor that is great for both design beginners and seasoned professionals. The service allows you to quickly and easily create cool posts for social networks, creative videos, presentations, Instagram Stories and other visual materials.

Currently, one of the effective ways to digitalize educational content is videos: promotional, instructive, lesson, thematic (news and story), educational - on the linguistic, thematic, situational and communicative component of the training course.

A promotional video is created to introduce and promote the distance learning course to target students. Promotional video recording is carried out in a studio using specialized equipment. Instructional videos are created based on pre-prepared 10–12 multimedia slides that describe the algorithm for completing a series of lessons as part of a weekly training load. Students see and hear explanations; Links to text and video sources, pronunciation samples of thematic and text vocabulary are provided.

Topic 7 Classification of tools for creating multimedia educational resources

Questions:

4. Existing multimedia resources that you can reuse.
5. Creating your own multimedia resources.
6. Encouraging students to create multimedia resources.

Task.

Create a multimedia product using animaker studio (https://www.animaker.ru). Your product should contain educational

content. This could be a lesson in programming, computer graphics or robotics.

With Animaker, users can add texts, images, photos and videos to their projects. The function of adding audio and sound effects is also available to make the video more interesting and attractive.

One of Animaker's unique tools is the ability to create characters using ready-made combinations of body parts. Users can choose different body types, faces, clothing and accessories for their characters, allowing them to create unique and original videos.

Animaker also provides the ability to add various effects and transitions between frames to add dynamics to your videos. Another useful feature is the ability to add graphs and charts that will help you visualize your data and make your video more informative.

Literature: [1] - [5], [11] - [16] , [26].

12. Lesson plans as a part of students independent work

Topic 3 Corel Draw Editor

Tasks

1. Conduct a comparative analysis of graphic file formats
2. Complete the tasks in 1.1 of [22].
3. Complete the tasks 1.2 of [22].

Materials for self-control

1. To which group is CorelDraw editor?
2. What screen display modes exist in the program, how do they differ and in what cases is it convenient to work in each mode?
3. What are the "default settings"? When does the dialog box appear to install them? What should I do to change the parameters for specific objects?

Methodological guidelines for implementation:

The tasks run in two modes: in the interactive tutorial (Teaching.exe), in the CorelDraw editor.

Literature: [1] - [5], **[6]** - [22].

Topic 4 PhotoShop Editor

Tasks

1. Complete the tasks 1.1-1.3 of [23].

2. Complete the tasks 2.1-2.3 of [23].
3. Complete the tasks 3.1-3.4 of [23].
4. Complete the tasks 5.1-5.5 of [23].
5. Complete the tasks 6.1-6.6 of [23].
6. Complete the tasks 8.1-8.4 of [23].

Methodological guidelines for implementation:

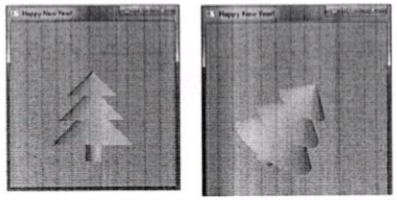
Jobs in two modes: in an interactive tutorial, in the editor Photoshop.

Literature: [1] - [5], [6] - [16], [23].

Topic 5 Composition and structure of multimedia technologies. Graphic representation of information in electronic educational resources

Tasks

1. Create a program that draws a New Year 3D tree:



Methodological guidelines for implementation:

To work with noPython libraries (for example, OpenGL), modules are required that enable the library functions to be called directly from the program in Python. The PyOpenGL library is a module that allows you to easily work with OpenGL, GLU and GLUT functions in Python programs, as well as with a number of OpenGL extensions.

For work we will need:

– Python Interpreter (https://www.python.org/downloads/).

– PyCharm development environment (https://www.jetbrains.com/pycharm/) (or any other for your taste, even a notepad will do).

– PyOpenGL Library (https://pypi.org/project/PyOpenGL/).

Literature: [1] - [5], [6] - [16], [24].

13. Themes of written work on the course, coursework

Topics of essay:

1. Classification of CGaA
2. Image formats
3. Layers
4. Gradients
5. Masks
6. Filters
7. Divide the image into slices
8. GIF animation
9. Layer effects
10. Raster graphics
11. Vector Graphics
12. Creating vector objects
13. Interactive Fill
14. Working with text
15. Creating electronic documentation
16. Effects for raster images
17. Body over a given trajectory.
18. Construction of a frame image of bodies in orthogonal and central projections.
19. Construction of realistic images taking into account shadows.
20. Graphical library of primitives for building three-dimensional objects.
21. Rotate images.

14. Information about assessment

Rating scale of assessment of student learning

Rating	Points
Formative	50 – 100
Midterm	50 – 100
Summative	50 – 100
Total	50 – 100

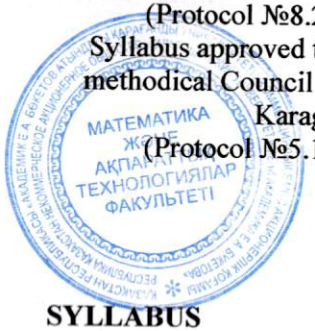
15. Exam questions on the course

1. Raster and vector graphics.
2. Methods of representing images in computer memory.

3. Classification of Multimedia technology and computer graphics software.
4. Color Models. Color management systems.
5. Graphic file formats
6. Transformation of objects in space, cameras
7. Obtaining projections
8. Texture overlay
9. Hardware graphics
10. Basic principles of work in Corel DRAW
11. Elements of the working window of the editor
12. Creating simple shapes
13. Drawing lines
14. Bases of work with the text
15. Selecting objects
16. Moving, copying and deleting objects
17. Use of a grid, guides and measuring rulers
18. Bind objects
19. Blocking of objects
20. The color of the outline and fill of the object
21. Change the relative position of objects
22. Combining objects into groups
23. Transformation of objects.
24. The thickness of the contour, the style of the lines and the different types of arrows.
25. Homogeneous filling. Gradient fill.
26. Filling with patterns. Fill texture.
27. Interactive filling.
28. The net fill.
29. Import and export of drawings.
30. Working with the text. Placing the text along the curve.
31. Using scripts.
32. Application of effects. Overflow of the object, the effect of similarity.
33. Interactive distortion.
34. Lenses.
35. Interactive transparency. Creating shadow objects.

Contents

Syllabus discussed at a chair meeting
(Protocol №8.2 of 21.04.2020)
Syllabus approved the scientific and
methodical Council of E.A. Buketov
Karaganda University
(Protocol №5.1 of 22.05.2020)



SYLLABUS

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for specialty: 6B01505 - Informatics

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