MoPED: Modernization of Pedagogical Higher Education by Innovative Teaching Instruments

HANDBOOK

TITLE OF THE COURSE:
MODERN TECHNOLOGIES IN FINE ARTS

SPECIALITY - 014.12 Secondary Education (figurative art)

HIGHER EDUCATION DEGREE: Bachelor

Developer: Ph.D. Andrii Tarasenko

Higher Education Institution: State Institution «South Ukrainian National Pedagogical University named after K.D. Ushinsky»

Faculty: Faculty of Arts and Graphics, Department of Theory and Methods of Applied and Decorative Arts and Graphics

2019 p.

Handbook «Modern technologies in fine arts»
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Handbook «Modern technologies in fine arts»
**Brief summary of the course:** The course is aimed at preparing future teachers and teachers of fine arts for the implementation of STEAM-education, through the use of innovative learning technologies, such as: ILS (Inquiry Learning Spaces), PBL (problem-based learning), BYOD (Bring Your Own Device), flipped learning, makeing, etc. The study of disciplines aimed at preparing young people to work with modern computer technology is associated with the urgent needs of our country in young professionals who know how to work with modern computer technology and is implemented in the ecosystem ICR (Innovation Classroom).

**Key words:** Computer graphics, fine arts, future teachers, professional activities, Graphic editors.
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Handbook «Modern technologies in fine arts»
1. DESCRIPTION OF THE COURSE

1.1. The volume of the course in ECTS credits and its distribution in hours by the forms of organization the educational process and types of classes:
ECTS credits: 4.0
Total number of hours: 105
4 lecture hours; 40 hours of practical classes; 61 hours – self-guided work of students.

1.2. Characteristics of the course by the form of study
Students are taught full-time form of study during the study of the discipline, in particular with the use of blended learning technology.

1.3. Course status
Discipline is a compulsory component of the educational program.

1.4. Incomes for studying the course
The initial notions of the concept of axiomatics and axiomatic theory, of the different types of relations between axioms and axiomatic theories. A brief review of the axiomatic theory of D. Hilbert of Euclidean geometry.

1.5. Year of study, semester
Y 2, S 4

1.6. Form of final control
Credit.

1.7. Language of the course
Ukrainian.

1.8. Internet address of the permanent placement of educational content of the course:
https://pdpu.edu.ua/

1.9. Developer.
Candidate of Art History. PhD. Andrii Tarasenko.

1.10. Purpose of the course

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To ensure a high level of preparedness of future teachers of fine arts to use innovative learning technologies in the educational process, namely, creating conditions for training future teachers to find and discover new, rational means of activity, implementation and implementation of their own ideas in solving pedagogical tasks and project creation, manifestation and development of creative abilities, divergent thinking, intellectual initiative, flexibility, mobility, etc.

1.11. Competences that are formed during the study of the course.

*Integral competence (CI)*

CI1. Ability to solve complex specialized problems and practical problems in the field of secondary education, which involves the application of certain theories and methods of education and fine arts and is characterized by complexity and uncertainty.

*General Competences (GC)*

GC 6. Ability to apply the acquired knowledge in practical situations.

GC11. Ability to generate new ideas (creativity).

*Professional (special) competencies*

SC 2. Ability to theoretical development of artistic heritage, professional orientation in the modern world and Ukrainian art space.

SC 5. Possession of visual literacy at the level necessary for the perception, evaluation and creation of an artistic image.

SC 6. Ability to practical artistic activity.

1.12. Expected learning outcomes of the course

As a result of mastering the discipline, the student should

PR-2. Demonstrate understanding and ability to use knowledge of fundamental and applied aspects of modern mathematics, English language and literature

PR-3. Know and accurately apply modern techniques and technologies, including information, for the successful and effective implementation of professional activities and quality assurance of research in the field

PR-9. Demonstrate skills of independent work with different sources of information, skills of self-education, ability to design specific areas of their own professional development

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PR 13. Demonstrate practical skills of teamwork, skills of analysis of someone else's professional activity, skills of introspection

1.13. Assessment of academic achievements of students

| Tools for diagnosing learning outcomes (current and final assessment) | Activity in practical classes, individual research task, team projects, project presentation |
| Summative assessment | The assessment system consists of the following types of educational activities: 6 intermediate creative works for evaluation of CI1 (40%), SC6 (40%). Activity at the practical lesson for assessment of SC11 (10%), SC2 (10%), final control (credit) for assessment of SC11 (5%), SC2 (5%), SC5 (5%) and SC6 (5%).
| | The final score will be obtained as follows: the final score is equal to CI1 (30%) + SC6 (30%) + GC11 (10 + 5%) + SC5 (5%) + SC6 (5%).
| | W = CI1 (30%) + GC6 (30%) + GC11 (15%) + SC2 2,5,6 (25%) |

Communication and feedback

The results of the test control, numbers for the class and the home control works and commentaries to them are represented in the register of marks Google Classroom. Use of the corporative mail of the teacher and the every student admits the additional opportunity for communication.

The students are informed by the results of summative assessment two working days after the exam with the help of the register of marks and the corporative mail.

Assessment scale

| 90–100 | A | Excellent |
| 82–89 | B | Very good |
| 74–81 | C | Good |
| 64–73 | D | Acceptable |
| 60–63 | E | Enough |
| 35–59 | FX | Unacceptable with the possibility to repeat |
| 1–34 | F | Unacceptable with the necessity of additional work on mastering the educational material |

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2. CONTENT AND STRUCTURE OF THE COURSE

2.1. MODULE 1 (105 hours)

2.2. Content module 1. Basics of computer graphics and graphic editors (20 hours)

2.2.1. Theme 1. History of computer graphics and graphic editors

2.2.2. Purpose and expected learning outcomes

*Purpose:* To form students-teachers of fine arts an idea and understanding of the history of development and the current state and possibilities of computer graphics for teachers of fine arts.

*Expected learning outcomes*

Formation of competencies:

CI 1 Ability to search, process and comprehensively analyze information from various sources, necessary for solving professional problems, using modern information and communication technologies.

GC 2. Ability to apply modern technologies in production activities; skills in working with modern computer software packages.

GC 3. Ability to business communications in the professional sphere, knowledge of the basics of business communication, teamwork skills.

SC 2. Ability to have computer skills, use information technology to solve experimental and practical problems in the field of professional activity.

SC 3. Ability to organize work in a creative STEAM workshop, distance, independent, extracurricular and extracurricular work in fine arts.

1) Program learning outcomes:

*Program learning outcomes:*

PRN-2. Based on the analysis of available data, the ability to formulate logical conclusions, define tasks and propose effective solutions, synthesize experience, knowledge, skills to achieve the goal.

PRN-3. Practical skills of teamwork, skills of analysis of someone else's professional activity, skills of self-analysis.
PRN-4. Ability to find, present, transform, analyze, summarize and systematize the data needed to solve professional problems and present their own experience.

2.2.3. Criteria, forms and terms of assessment on the theme 1

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Quantitative and / or qualitative characteristics</th>
</tr>
</thead>
</table>
| Knowledge of basic concepts and terms of history of computer graphics and graphic editors, the main stages, the main directions of development and application of graphic editors. | High level: the student has a systematic, reasoned, deep knowledge of educational material, is able to independently assess some new facts and phenomena, uses a variety of sources of information.  
Sufficient level: the student possesses the educational material at a sufficient level, reasonably states its main content during the answers, but without a comprehensive analysis and argumentation.  
Average: the student partially owns the study material, but shows basic knowledge. During the answers he teaches the educational material in fragments, superficially, insufficiently reveals the content of theoretical questions and practical tasks.  
Initial level: the student partially or insufficiently owns the educational material, operates with initial ideas during the answers, insufficiently reveals the content of theoretical questions, admits inaccuracies and errors. |
| Ability to independently choose the graphic editors to solve a creative task, justify their choice, present their views. | High level: the student uses a variety of sources of information, solves complex problems, shows creativity and ability to original solutions to certain situations.  
Sufficient level: the student uses a variety of sources of information, solves simple problem and / or typical problems, shows the ability and ability to solve certain situations.  
Intermediate level: the student uses a limited number of sources of information, solves |
simple typical problems, insufficiently and superficially reveals the content of solutions to certain situations.

*Initial level:* the student uses a limited number of sources of information, while performing simple standard tasks is insufficient and superficially reveals the content of solutions to certain situations, makes inaccuracies and errors.

2.2.4. **Digital tools.** Tools for working in a network environment, with mobile learning devices, online presentation and video editing.

2.2.5. **Innovative learning technologies.** Technologies for the development of critical thinking, problem-oriented learning, blended learning, distance learning technologies.

2.2.6. **Lecture 1.** History of computer graphics and graphic editors

Plan:

2. An impact of Computer graphics on man-machine interface and graphical user interface.
3. Classification of computer graphics.
4. Examples of the use of computer graphics in everyday’s life.

2.2.7. **Task for independent work of students.**

Tasks for independent work. Development of a presentation on the topic of pioneers in the field of computer graphics. Ivan Sutherland, the "father of computer graphics".

2.2.8. **Tasks for self-guided work on the theme 1**

Prepare a presentation on the topic:

Vector, or object, editors;
Raster editors;
Three-dimensional graphic editors.

2.2.9. **Methodical materials and instructions to the theme**

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2.3.1. Theme 2. Basic concepts, terms, main trends in computer graphics.

2.3.2. Purpose and expected learning outcomes

*Purpose*: To form in students-teachers of fine arts an idea about main concepts, terms, the progress to date and main trends of computer graphic as an art.

2.3.3. Criteria, forms and terms of assessment on the theme 2.

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Quantitative and / or qualitative characteristics</th>
</tr>
</thead>
</table>
| Knowledge of basic concepts and terms of history of computer graphics and graphic editors, the main stages, the main directions of development and application of graphic editors. | **High level**: the student has a systematic, reasoned, deep knowledge of educational material, is able to independently assess some new facts and phenomena, uses a variety of sources of information  
**Sufficient level**: the student possesses the educational material at a sufficient level, reasonably states its main content during the answers, but without a comprehensive analysis and argumentation.  
**Average**: the student partially owns the study material, but shows basic knowledge. During the answers he teaches the educational material in fragments, superficially, insufficiently reveals the content of theoretical questions and practical tasks.  
**Initial level**: the student partially or insufficiently owns the educational material, operates with initial ideas during the answers, insufficiently reveals the content of theoretical questions, admits inaccuracies and errors. |
2.3.4. **Digital tools.** Tools for working in a network environment, digital software for creating interactive presentations, free educational presentation templates for online lessons.

2.3.5. **Innovative teaching / learning technologies.** Technologies for the development of critical thinking, problem-oriented learning, blended learning, distance learning technologies.

2.3.6. **Practical class 1.**

Basic concepts, terms, main trends in computer graphics. Solving practical problems using online search.

2.3.7. **Individual tasks to the theme 2**

(Face-to-Face Phase) 1. Individual work: survey of students on the basic concepts of the topic (Area of interactive learning).

2. Group work on creating a map of opinions on the advantages and disadvantages of using different graphic editors to solve applied problems (brainstorming area).

(Post Phase) 3. Group work: round table discussion on the results of group work (Interactive learning area).

2.3.8. **Tasks for self-guided work on the theme 2**

Prepare a presentation on the topic of the first graphic editors, for example Sketchpad.

2.3.9. **Methodical materials and instructions to the theme**


2.4.1. **Theme 3.** Computer graphics, features of raster and vector graphics, advantages and spheres of use.

2.4.2. **Purpose and expected learning outcomes**

*Handbook «Modern technologies in fine arts»*
**Purpose:** To form students-teachers of fine arts an understanding of features and differences of raster and vector graphics, advantages and spheres of use.

**Expected learning outcomes**
Formation of competencies:

CI 1 Ability to search, process and comprehensively analyze information from various sources, necessary for solving professional problems, using modern information and communication technologies.

GC 2. Ability to apply modern technologies in production activities; skills in working with modern computer software packages.

GC 3. Ability to business communications in the professional sphere, knowledge of the basics of business communication, teamwork skills.

SC 2. Ability to have computer skills, use information technology to solve experimental and practical problems in the field of professional activity

SC 3. Ability to organize work in a creative STEAM workshop, distance, independent, extracurricular and extracurricular work in fine arts.

1) Program learning outcomes:

**Program learning outcomes:**

PRN-2. Based on the analysis of available data, the ability to formulate logical conclusions, define tasks and propose effective solutions, synthesize experience, knowledge, skills to achieve the goal.

PRN-3. Practical skills of teamwork, skills of analysis of someone else's professional activity, skills of self-analysis.

**2.4.3. Criteria, forms and terms of assessment on the theme 3**

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Quantitative and / or qualitative characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer graphics, features of raster and vector graphics.</td>
<td><strong>High level:</strong> the student has a systematic, reasoned, in-depth knowledge of the study material, is able to independently assess some new facts and phenomena, uses a variety of sources of information. <strong>Sufficient level:</strong> the student has the...</td>
</tr>
</tbody>
</table>

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educational material at a sufficient level, reasonably teaches its main content during the answers, but without a comprehensive analysis and argumentation.

**Intermediate level**: the student partially owns the study material, but shows basic knowledge. During the answers teaches the study material in fragments, superficially, insufficiently reveals the content of theoretical questions and practical tasks.

**Low level**: the student partially or insufficiently masters the educational material, is conditioned by the initial ideas during the answers, does not sufficiently reveal the content of theoretical questions, admits inaccuracies and errors.

### 2.4.4. Digital tools.

Tools for working in a network environment, with mobile learning devices, online presentation and video editing.

### 2.4.5. Innovative teaching / learning technologies

Problem-based learning, technologies for the development of critical thinking.

### 2.4.6. Lecture 2.

Computer graphics, features of raster and vector graphics, advantages and spheres of use.

Raster vs Vector Maps: What is the Difference;

Raster Data Vector Data;

Advantages & Disadvantages;

Use Cases.

### 2.4.7. Individual tasks to the theme 3

*Handbook «Modern technologies in fine arts»*
Prepare a presentation on the topic:

Art and advertising graphics

2.4.8. Tasks for self-guided work on the theme 3
The choice of hardware and software depending on the purpose and individual characteristics of students.

2.4.9. Methodical materials and instructions to the theme

Content module 2. Raster and vector graphics editors for art teachers

2.5.1. Theme 4. Overview of software for computer graphics, raster and vector graphics (graphic editors, commercial, freeware, online editors).

2.5.2. Purpose and expected learning outcomes

Purpose: To form students-teachers of fine arts an understanding of software for computer graphics, raster and vector graphics (graphic editors, commercial, freeware, online editors).

2.5.3. Criteria, forms and terms of assessment on the theme 4

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Quantitative and / or qualitative characteristics</th>
</tr>
</thead>
</table>
| Computer graphics, features of raster and vector graphics. | **High level:** the student has a systematic, reasoned, in-depth knowledge of the study material, is able to independently assess some new facts and phenomena, uses a variety of sources of information  
Sufficient level: the student has the educational material at a sufficient level, reasonably teaches its main content during |

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the answers, but without a comprehensive analysis and argumentation.

**Intermediate level:** the student partially owns the study material, but shows basic knowledge. During the answers teaches the study material in fragments, superficially, insufficiently reveals the content of theoretical questions and practical tasks.

**Low level:** the student partially or insufficiently masters the educational material, is conditioned by the initial ideas during the answers, does not sufficiently reveal the content of theoretical questions, admits inaccuracies and errors.

### 2.5.4. Digital tools.
Tools for working in a network environment, with mobile learning devices, online presentation and video editing.

### 2.5.5. Innovative teaching / learning technologies
Problem-based learning, technologies for the development of critical thinking.

### 2.5.6. Practical class 2.
Graphic editors, commercial, freeware, online editors. Choosing Best free online photo editor with free graphic design templates.

Basic concepts, terms, main trends in computer graphics. Solving practical problems using online search.

### 2.5.7. Individual tasks to the theme 4
Installation/registering a graphic editor on students choice.

### 2.5.8. Tasks for self-guided work on the theme 4
Prepare a presentation on the topic:

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Vector, or object, editors, Raster editors, Three-dimensional graphic editors overview.

### 2.5.9. Methodical materials and instructions to the theme

Presentations in *.PPT and *.PDF format and their printout are made by teachers or students of previous courses.

### 2.5.1. Theme 5. Vector / raster graphics editor tools and their use.

Node / contour editing tool, perspective projection, complex gradient fill.

### 2.5.2. Purpose and expected learning outcomes

**Purpose**: To form students-teachers of fine arts an understanding of vector / raster graphics editor tools and their use. Mastering crucial editing tools.

### 2.5.3. Criteria, forms and terms of assessment on the theme 5

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Quantitative and / or qualitative characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical skills of graphic editors use.</td>
<td><strong>High level</strong>: the student has a systematic, reasoned, in-depth knowledge of the study material, is able to independently assess some new facts and phenomena, uses a variety of sources of information</td>
</tr>
<tr>
<td>Practical skills of realization of BYOD, PBL, ILS technologies in the educational process of fine arts in secondary schools.</td>
<td><strong>Sufficient level</strong>: the student has the educational material at a sufficient level, reasonably teaches its main content during the answers, but without a comprehensive analysis and argumentation.</td>
</tr>
<tr>
<td><strong>Intermediate level</strong>: the student partially owns the study material, but shows basic knowledge. During the answers teaches the study material in fragments, superficially, insufficiently reveals the content of theoretical questions and practical tasks</td>
<td><strong>Intermediate level</strong>: the student partially owns the study material, but shows basic knowledge. During the answers teaches the study material in fragments, superficially, insufficiently reveals the content of theoretical questions and practical tasks</td>
</tr>
</tbody>
</table>

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2.5.4. Digital tools.
Tools for working in a network environment, with mobile learning devices, online presentation and video editing. Available freeware or commercial editors. Canva online tools for PC/tablet.

2.5.5. Innovative teaching / learning technologies
BYOD, PBL, ILS technologies in the educational process of fine arts in secondary schools.

2.5.6. Practical class 3.
Practical skills of graphic editors use. Forming Image Editing Skills for Graphic Designer-teacher.

2.5.7. Individual tasks to the theme 5
Creating a lesson plan for modern technologies in fine arts. Using the online editor Canva on the example of a lesson plan.

2.5.8. Tasks for self-guided work on the theme 5
1. Individual work: survey of students on the basic concepts of the topic
2. Group work: round table on the results of group work (Interactive learning area).

2.5.9. Methodical materials and instructions to the theme
1. Canva.com - Online Design [www.canva.com]

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2.5.1. **Theme 6.** Raster graphics editor tools. Working with layers, filters, photo collage, retouching.

2.5.2. **Purpose and expected learning outcomes**

**Purpose:** To form students-teachers of fine arts an understanding and experience with graphics editor tools. Experience with layers, filters, photo collage, retouching.

2.5.3. **Criteria, forms and terms of assessment on the theme 6**

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Quantitative and / or qualitative characteristics</th>
</tr>
</thead>
</table>
| Practical skills of graphic raster graphics editors use. Raster graphics editor tools. Working with layers, filters, photo collage, retouching. | **High level:** the student has a systematic, reasoned, in-depth knowledge of the study material, is able to independently assess some new facts and phenomena, uses a variety of sources of information  
**Sufficient level:** the student has the educational material at a sufficient level, reasonably teaches its main content during the answers, but without a comprehensive analysis and argumentation.  
**Intermediate level:** the student partially owns the study material, but shows basic knowledge. During the answers teaches the study material in fragments, superficially, insufficiently reveals the content of theoretical questions and practical tasks  
**Low level:** the student partially or insufficiently masters the educational material, is conditioned by the initial ideas during the answers, does not sufficiently reveal the content of theoretical questions, |
2.5.4. Digital tools.
Tools for working in a network environment, with mobile learning devices, online presentation and video editing. Available freeware or commercial editors. Optional GIMP (GNU Image Manipulation Program), BeFunky, Image Composite Editor, ImageEdit.

2.5.5. Innovative teaching / learning technologies
BYOD, PBL technologies in the educational process of fine arts in secondary schools.

2.5.6. Practical class 4.
Experience with graphics tools do graphic designers use. What are graphic tools. Where can I edit graphics? Graphic design software for beginners.

2.5.7. Individual tasks to the theme 6
1. Individual work: survey of students on the basic concepts of the topic
2. Group work: round table on the results of group work (Interactive learning area).

2.5.8. Tasks for self-guided work on the theme 6
Prepare a presentation on the topic:
Vector, or object, editors;
Raster editors;
Three-dimensional graphic editors.

2.5.9. Methodical materials and instructions to the theme
2. GIMP User Manual www.gimp.org/docs/

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2.5.1. **Theme 7.** Group active methods. Team work on projects.

2.5.2. **Purpose and expected learning outcomes**

**Purpose:** To acquaint students-teachers of fine arts with group active teaching methods and their specifics during modern technologies in fine arts classes.

2.5.3. **Criteria, forms and terms of assessment on the theme 7**

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Quantitative and / or qualitative characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge and understanding of the use of active and group forms of modern technologies in fine arts classes.</td>
<td>High level - the student knows and understands the content of the use of active and group forms of modern technologies in fine arts classes. Intermediate level - the student knows and partially understands the content of use active and group forms of modern technologies in fine arts classes. Low level - the student knows and partially understands the content of the use of active and group forms of modern technologies in fine arts classes.</td>
</tr>
</tbody>
</table>
### Ability to develop independently and in groups fragments of the lesson using group active learning methods.

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>High level</td>
<td>During group work mutual respect is traced, coherence and work of each student. The answers are substantiated, students are able to independently argue the facts and defend a common position. The result of the work of the whole group is presented in a team.</td>
</tr>
<tr>
<td>Sufficient level</td>
<td>There is mutual respect between the members of the group, coherence and work of almost every student; however, not all students worked actively. The answers are complete, logical, but lack their own judgments. The result of the work of the whole group is presented by one / two most active students.</td>
</tr>
<tr>
<td>Intermediate level</td>
<td>There were often misunderstandings between group members; not all participants worked actively. The answers are fragmentary, due to insufficient knowledge of the problem. The presentation of the group's work is almost not organized.</td>
</tr>
<tr>
<td>Entry level</td>
<td>There is no mutual understanding and cooperation between group members; not all participants worked actively. The answers are fragmentary and unsubstantiated, due to a superficial acquaintance with the problem. The presentation of the group's work is not organized.</td>
</tr>
</tbody>
</table>

### 2.5.4. Digital tools.

Tools for working in a network environment, with electronic documents; with mobile learning devices; with visualization tools.

### 2.5.5. Innovative teaching / learning technologies

*Handbook «Modern technologies in fine arts»*
Technologies for the development of critical thinking, problem-oriented learning, blended learning, distance learning technologies.

Innovative classrooms: study, work area and brainstorming area.

2.5.6. Practical class 5.

Methodical features of integrated classes on modern technologies in fine arts.

2.5.7. Individual tasks to the theme 7

(Face-to-Face Phase) 1. Individual work: survey of students on the basic concepts of the topic (Area of interactive learning).

2. Group work on creating a map of opinions on the advantages and disadvantages of using different classes of modern technologies in fine arts to solve applied problems (Interactive learning area; brainstorming area).

(Post Phase) 3. Group work: round table discussion on the results of group work (Interactive learning area).

2.5.8. Tasks for self-guided work on the theme 7

1. Learn the tasks aimed at the development of personality during the training of modern technologies in fine arts.

2. Examine the integration of technical and humanitarian components in problem solving.

2.5.9. Methodical materials and instructions to the theme

Presentations in *.PPT and *.PDF format and their printing are made by teachers or students of previous courses.

2.5.1. Theme 8. Interdisciplinary nature of learning. Formation of integration relationships depending on the individual characteristics of students. Features of learning technologies.

2.5.2. Purpose and expected learning outcomes

**Purpose:** to acquaint students with the peculiarities of the use and application of interdisciplinary connections in the teaching of modern technologies in fine arts.

2.5.3. Criteria, forms and terms of assessment on the theme 8

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<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Quantitative and / or qualitative characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge and understanding using interdisciplinary connections during modern technologies in fine arts classes.</td>
<td>High level: the student has a systematic, reasoned, in-depth knowledge of the study material, is able to independently assess some new facts and phenomena, uses a variety of sources of information. Sufficient level: the student has the educational material at a sufficient level, reasonably teaches its main content during the answers, but without a comprehensive analysis and argumentation. Intermediate level: the student partially owns the study material, but shows basic knowledge. During the answers teaches the study material in fragments, superficially, insufficiently reveals the content of theoretical questions and practical tasks. Low level: the student partially or insufficiently masters the educational material, is conditioned by the initial ideas during the answers, does not sufficiently reveal the content of theoretical questions, contains inaccuracies and errors.</td>
</tr>
<tr>
<td>Ability to independently develop fragments of the lesson using interdisciplinary connections. Practical skills of realization of the lesson plan, formation of creative practical tasks in the educational process of fine arts in secondary schools.</td>
<td>High level - the student independently: formulates the expected results. Intermediate - student in part: formulates expected results. Student develops a lesson plan using modern technology, allocates formative and summative assessment. Low level - a student with the help of</td>
</tr>
</tbody>
</table>
2.5.4. Digital tools.
Tools for working in a network environment, with electronic documents; with mobile learning devices; with visualization tools.

2.5.5. Innovative teaching / learning technologies
Technologies for the development of critical thinking, problem-oriented learning, blended learning, distance learning technologies.

2.5.6. Practical class 6.
Study and consideration of the main hardware and software limitations in solving didactic problems in art lessons.

2.5.7. Individual tasks to the theme 7
(Face-to-Face Phase) 1. Individual work: survey of students on the basic concepts of the topic (Area of interactive learning).

2. Group work on creating a map of opinions on the advantages and disadvantages of using different classes of robotic systems to solve applied problems (Interactive learning area; brainstorming area).

(Post Phase) 3. Group work: round table discussion on the results of group work (Interactive learning area).

2.5.8. Tasks for self-guided work on the theme 7
Creating/developing a lesson plan and developing examples of practical tasks.

2.5.9. Methodical materials and instructions to the theme

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2. The lecture presentation is (will be) available at the link https://moped.pdpu.edu.ua/

2.5.1. **Theme 9.** Graphic information output devices, image printing. Features of 2D/3D printing

2.5.2. **Purpose and expected learning outcomes**

**Purpose:** To form students-teachers of fine arts an understanding of the basics features of 2D/3D printing.

2.5.3. **Criteria, forms and terms of assessment on the theme**

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Quantitative and / or qualitative characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of the basics features of 2D/3D printing.</td>
<td><em>High level:</em> the student has a systematic, reasoned, deep knowledge of educational material, is able to independently assess some new facts and phenomena, uses a variety of sources of information</td>
</tr>
<tr>
<td>The main stages, the main directions of development and application of 2D/3D printing.</td>
<td><em>Sufficient level:</em> the student possesses the educational material at a sufficient level, reasonably states its main content during the answers, but without a comprehensive analysis and argumentation.</td>
</tr>
<tr>
<td></td>
<td><em>Average:</em> the student partially owns the study material, but shows basic knowledge. During the answers he teaches the educational material in fragments, superficially, insufficiently reveals the content of theoretical questions and practical tasks.</td>
</tr>
<tr>
<td>Ability to independently solve a problem</td>
<td><em>Initial level:</em> the student partially or insufficiently owns the educational material, operates with initial ideas during the answers, insufficiently reveals the content of theoretical questions, admits inaccuracies and errors.</td>
</tr>
</tbody>
</table>

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creative task, justify their choice, present their views using 2D/3D printing equipment. sources of information, solves complex problems, shows creativity and ability to original solutions to certain situations.

*Sufficient level*: the student uses a variety of sources of information, solves simple problem and/or typical problems, shows the ability and ability to solve certain situations.

*Intermediate level*: the student uses a limited number of sources of information, solves simple typical problems, insufficiently and superficially reveals the content of solutions to certain situations.

*Initial level*: the student uses a limited number of sources of information, while performing simple standard tasks is insufficient and superficially reveals the content of solutions to certain situations, makes inaccuracies and errors.

### 2.5.4. Digital tools

Tools for working in a network environment, with electronic documents; with mobile learning devices; with visualization tools.

### 2.5.5. Innovative teaching / learning technologies

Technologies for the development of critical thinking, problem-oriented learning, blended learning, distance learning technologies.

### 2.5.6. Practical class 7

Advanced printing techniques to produce an object with enhanced functionality and with a wide range of applications.

Ability to produce very complex shapes or geometries.

Difference in How it Works. Printing versus Manufacturing.

Materials and Methods.

Easier Designs.

### 2.5.7. Individual tasks to the theme 9

1. Individual work: survey of students on the basic concepts of the topic

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2. Group work: round table on the results of group work (Interactive learning area).

2.5.8. Tasks for self-guided work on the theme 9
Introduction and practical use of 2D printers for printing completed creative work. Introduction to 3D printing technologies. CNC milling machine as a creative tool in art.

2.5.9. Methodical materials and instructions to the theme

2.5.4. Digital tools
Tools for working in a network environment, with electronic documents; with mobile learning devices; using visualization tools.

2.5.5. Innovative learning / learning technologies
Technologies for the development of critical thinking, problem-oriented learning, blended learning, distance learning technologies.

2.5.6. Practical class 7
Advanced printing technologies to create an object with advanced functionality and a wide range of applications.
Ability to create very complex shapes or geometries.
The difference is how it works. Printing against production.
Materials and methods.
Simpler designs.

2.5.7. Individual tasks on topic 9
1. Individual work: survey of students on the basic concepts of the topic
2. Group work: round table on the results of group work (Interactive learning area).

2.5.8. Tasks for independent work on the topic 9
Introduction and practical use of 2D printers for printing completed creative works. Introduction to 3D printing technologies. CNC milling machine as a creative tool in art.

2.5.9. Methodical materials and instructions on the topic

3. List of recommended sources (including electronic resources).

1. Main:

   1. Гуревич Р. С. Інноваційні освітні технології в навчальному процесі ВНЗ / Р. С. Гуревич // Зб. наук. пр. Сучасні інформаційні технології та інноваційні методики навчання у підготовці фахівців:

   *Handbook «Modern technologies in fine arts»*


2. **Auxiliary:**

1. А. А. Тарасенко. Методичні рекомендації до курсу «Комп’ютерна графіка» для студентів 2 курсу спеціалізації 014 Середня освіта (Образотворче мистецтво).


3. Orchestrating Inquiry-Based Learning Spaces: an Analysis of Teacher Needs Maria Jesús Rodríguez-Triana, Adrian Holzer, Andrii Voznuik, Denis Gillet. [Електронний ресурс] – Режим доступу до ресурсу: https://telelearn.archives-ouvertes.fr/hal-01206717/document


3. **Supplementary:**


