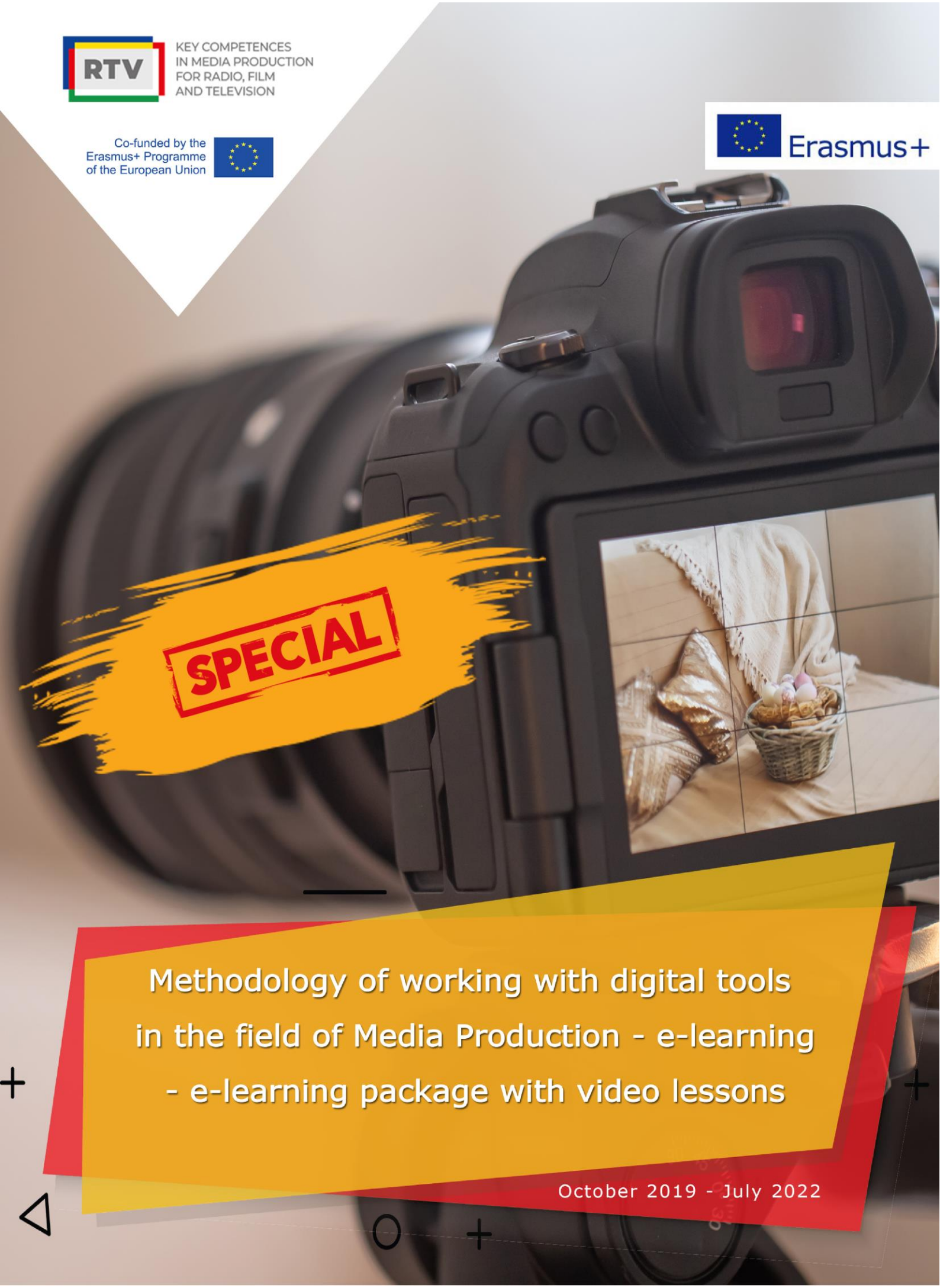
RTV

KEY COMPETENCES IN MEDIA PRODUCTION FOR RADIO, FILM AND TELEVISION

Co-funded by the Erasmus+ Programme of the European Union

Erasmus+



Methodology of working with digital tools in the field of Media Production - e-learning - e-learning package with video lessons

October 2019 - July 2022

Radio România
Colegiul Tehnic "Media" București
PIXEL
université lumière lyon 2
Co-funded by the Erasmus+ Programme of the European Union

KEY COMPETENCES IN MEDIA PRODUCTION FOR RADIO, FILM AND TELEVISION

Erasmus+

“The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the National Agency and Commission cannot be held responsible for any use which may be made of the information contained therein”.

PROJECT PARTNERS

PROJECT INFORMATION

Project number: 2019-1-RO01-KA202-063974

October 2019 – July 2022

www.rtv-erasmusproject.eu

This cover has been designed using resources from www.Freepik.com

LESSON FRAMEWORK

Education Unit: Colegiul Tehnic MEDIA

Teaching Unit:

Teacher :

Class :

Date :

Lesson : The eye, as optical system

Type of lesson: mixte (acquisition of knowledge, systematization, practice and assessment of intellectual work skills) and hybrid system (besides using the adequate equipment and the face-to-face interaction, it is necessary to use technologies for the act of teaching-learning in the online environment).

General skills: - Appropriate use of specific terminology and languages to explain the characteristics of the optical system;

- Understanding the principles of imaging on the retina of the eye;
- Recognition of sight characteristics.

Specific skills:

- Knowledge of the elements of vision responsible for forming images on the surface of the retina;
- Understanding the mechanism of visual perception of contrasts and details;
- Defining the notion of visual inertia;
- Ability to understand the eye as an optical system.

Operational objectives:

Cognitive:

O1: To recognize the elements that form the eye as an optical system;

O2: To know the basics of eye physiology;

O3: To identify the role of each component of the eye in view;

O4: To understand how images are formed on the retina;

O5: To understand the notion of focal length.

Training:

O6: To identify the types of visual fields;

O7: To recognize the specific response of the eye to stimuli: accommodation, adaptation;

O8: To differentiate the visual perception of contrasts from that of details;

O9: To recognize the formation of images while observing objects.

Attitudinal:

O10: show interest in acquiring knowledge about the eye as an optical system.

Values and attitudes:

Manifestation of the willingness to apply the acquired knowledge about the eye as an optical system

Identify the importance of knowing how the eye works in the process of seeing

Strategies: directed, inductive - deductive, explanatory - conversational

Methods:

expository - heuristic: M1-explanation; M2- heuristic conversation;

interactive: M3 - "learning through discovery"; M4 - demonstration; M5 - experimentation; M6 - comparison; M7 - brainstorming;

M8 - problematization

Evaluation: informative (notions and classifications regarding the process of vision) and **formative** (acquisitions of new knowledge about the eyes as an optical system, correct use of specialized language, ability to synthesize and analyze, ability to use the principles of vision in a given context / application).

Assessment tools: oral verification; systematic observation; individual and / or group project.

Forms of organizing the activity: face-to-face, independent and in groups.

Material resources:

- Printed and digital images / photos, media such as magazines, newspapers, websites
- Camera, photo editing software
- Computer with high speed internet access

- Schemes for using cameras and / or mobile devices that allow photo editing
- Digital blackboards
- Smart devices, cables and specific equipment
- Specialized laboratory

Resources: human: 20 students

time: 50 ′

materials: - official: m 1 Curriculum for the respective discipline

m 2 Didactic macro-design

m 3 Design of learning units and laboratories

m4 The manual

m5 Methodological guide

– unofficial: m 6 - Worksheet 1

Annex 1

FEED-BACK SHEET

I. Define the notions of eye accommodation and eye adaptation, highlighting the difference between the two notions.

II. Describe the types of visual field and determine their individual boundaries.

III. Explain the visual perception of contrasts and details.

Working time: 10 minutes

LESSON STRUCTURE

Education Unit: Colegiul Tehnic MEDIA

Teaching Unit:

Teacher :

Class :

Date :

Lesson : The resemblance between the visual organ and the image capture device

Type of lesson: mixte (acquisition of knowledge, systematization, practice and assessment of intellectual work skills) and **hybrid system** (besides using the adequate equipment and the face-to-face interaction, it is necessary to use technologies for the act of teaching-learning in the online environment).

General skills:

- Adequate use of specific terminology and languages to explain the characteristics of visual perception;
- Understanding the principles of retinal imaging;
- Recognition of static and dynamic images.

Specific skills:

- Knowledge of the characteristics of still images retained with the camera;
- Understanding the dynamic image recording mechanism with the camera;

- Defining the analogy between the eye and the camera;
- Ability to understand the principles of recording dynamic images.

Operational objectives:

Cognitive:

O1: To recognize the structure of the organ of sight: the eye;

O2: To recognize devices that capture images;

O3: To identify the differences between photographic, cinematographic and eye images;

O4: To understand how images are formed in the darkroom of a camera;

Training:

O5: To identify similarities between eyes and cameras;

O6: To recognize the specifics of images obtained by shooting;

O7: To differentiate photographic, static images from cinematographic, dynamic images;

O8: To know the principles of recording dynamic images.

Attitudinal:

O9: Show interest in acquiring knowledge about the resemblance between eyes and image capture devices.

Values and attitudes:

Demonstrate readiness to apply knowledge regarding the similarity between the eyes and the imaging device

Identify the importance of knowing how image recorders work compared to the human eye

Strategies: directed, inductive – deductive, explanatory – conversational.

Methods:

expository - heuristic: M1-explanation; M2- heuristic conversation;

interactive: M3 - "learning through discovery"; M4 - demonstration; M5 - experimentation; M6 - comparison; M7 – brain storming;

M8 - problematization.

Assessment: informative (notions and classifications regarding the image capture process) and **formative** (acquisition of new knowledge about the eyes as a model for the camera, correct use of specialized language, ability to synthesize and analyze, ability to use the principles of vision in a given context / application.

Assessment tools: oral verification; systematic observation; individual and / or group project.

Forms of organizing the activity: face-to-face, independent and in groups.

Material resources:

- Printed and digital images / photos, media such as magazines, newspapers, websites

- Camera, photo editing software
- Computer with high speed internet access
- Schemes for using cameras and / or mobile devices that allow photo editing
- Digital tables
- Smart devices, cables and specific equipment
- Specialized laboratory

Resources: human: 20 students

time: 50 ′

materials: - official: m 1 Curriculum for the respective discipline

m 2 Didactic macro-design

m 3 Design of learning units and laboratories

m 4 The manual

m 5 Methodological guide

Unofficial: m 6 - Worksheet 1

Annex 1

FEED-BACK SHEET

I. Describe the similarities between the optical structure of the eye and that of a photo camera.

II. Compare images recorded with a camera with those recorded with a video camera.

III. Define the principles of dynamic image recording.

Working time: 10 minutes

LESSON STRUCTURE

Education Unit: Colegiul Tehnic MEDIA

Teaching Unit:

Teacher :

Class :

Date :

Lesson : Equipment for performing device movements - I

Type of lesson: mixte (acquisition of knowledge, systematization, practice and assessment of intellectual work skills) and **hybrid system** (besides using the adequate equipment and the face-to-face interaction, it is necessary to use technologies for the act of teaching-learning in the online environment).

General skills:

- Appropriate use of terminology and specific languages to know the movements of the device;
- Understanding the role of technical equipment that allows the performance of device movements;
- Recognize the types of camera movements depending on the complexity of the filming.

Specific skills:

- Knowledge of the types of devices (panoramic heads) used for simple movements of the device;
- Recognition of the principle of operation of simple panoramic friction heads;
- Recognition of the principle of operation of the heads with crank control;

- Ability to differentiate the types of panoramic heads.

Operational objectives:

Cognitive:

O1: To recognize simple movements of the device;

O2: To identify the movement of the device in two coordinates;

O3: To identify panning movements;

O4: To recognize the complex movements of the device;

Training:

O5: Recognize the auxiliary devices of the cameras that are used to perform simple movements;

O6: know the limits of horizontal and vertical panning angles;

O7: Recognize the difference between the types of panoramic heads;

O8: to recognize the movements allowed by the different panoramic ends;

Attitudinal:

O9: show interest in acquiring knowledge of device equipment.

Values and attitudes:

Manifestation of willingness to apply the knowledge acquired about the equipment used to perform the movements of the device.

Identify the importance of knowing the types of equipment for performing machine movements.
Strategies: directed, inductive - deductive, explanatory - conversational

Methods:

expository - heuristic: M1 - explanation; M2 - heuristic conversation;

interactive: M3 - “learning through discovery”; M4 - demonstration; M5 - experimentation; M6 - comparison; M7 - brainstorming; M8 - problematization.

Assessment: informative (notions and classifications regarding the equipment used to perform the device movements) and **formative** (acquisitions of new knowledge about the equipment for the device movements, correct use of specialized language, ability to synthesize and analyze, ability to use the equipment to perform device movements in a given context / application.

Assessment tools: oral verification; systematic observation; individual and / or group project.

Forms of organizing the activity: face-to-face, independent and in groups.

Material resources:

- Video or motion picture movies
- Videocamera
- Computer with high - speed internet access
- Videocamera usage patterns
- Digital blackboards
- Smart devices, cables and specific equipment
- Specialized laboratory

Resources: human: 20 students

time: 50 ′

materials: - official: m 1 Curriculum for the respective subject (Film)

m 2 Didactic macro-design;

m 3 Design of learning units and laboratories

m4 The manual

m5 Methodological guide

Unofficial: m 6 - Worksheet 1

Annex 1

FEED-BACK SHEET

I. Describe the equipement used to perform simple device movements.

II. Identify the differences between the types of movements of the device depending on their complexity.

III. Describe the operation of simple friction panning heads compared to the operation of crank-operated panning heads.

Working time: 20 minutes

Module 21 - Equipment for performing the device movements - II

• Equipment and technical means for performing the movements of the device in a single plane;

• Equipment and technical means for performing complex device movements.

Equipment and technical means for performing the movements of the device in a single plane

This category of equipment includes various types of trolleys, designed to ensure that the video camera moves horizontally.

Traveling trolleys move on rails on the ground. In order to make the movements as smooth as possible, the wheels of the trolley are provided with rubber bands, and the rails are joined in such a way that they do not show any unevenness.

The construction of the trolley wheel train allows the description of some of the most different trajectories, depending on the configuration of the rails used.

The advantage of traveling trolleys is that they can be used even on uneven ground, as their running track - the rails can be placed horizontally, by inserting compensating wedges between the rail and the ground.

Equipment and technical means for performing complex device movements

This category includes various types of "dolly" strollers and film cranes.

Dolly strollers in terms of the constructive solution used to perform complex movements of the device, can be found in two variants of principle:

- **dolly stroller with movable arm;**
- **dolly stroller with telescopic column.**

The mobility of the camera, ie the movable arm or the telescopic column, can be operated in several ways:

- **by mechanical systems,** which consist of gears controlled by means of cranks. In this case, the weight of the device is compensated by means of springs installed under the arm.
- **by hydraulic systems,** the oil pressure necessary to operate the arm is obtained with the help of manually or electrically controlled pumps;
- **by mixed pneumo-hydraulic systems**. In the case of such systems, the hydraulic system uses as a source of energy containers filled with high pressure gases (nitrogen, carbon dioxide).

Film cranes are one of the most complex technical means, which, on a much larger scale, allow the same movements of the device, as in the case of dolly trolleys.

On the platform of the movable arm, located at one of its extremities, the camera can be mounted on its own support, which allows it to rotate within a 360 ° angle, in addition to the one that the platform can perform around its central pivot, together with the crane arm.

In order for the movable arm to be able to move smoothly and effortlessly, the platform together with the load it carries (the camera, the operator and its assistant) is balanced with the help of counterweights placed at the opposite end of the arm.

As in the case of dolly trolleys, filming cranes can be operated in different ways (manual, hydraulic, electric).

LESSON STRUCTURE

Education Unit: Colegiul Tehnic MEDIA

Teaching Unit:

Teacher :

Class :

Date :

Lesson : Equipment for performing the device movements - II

Type of lesson: mixte (acquisition of knowledge, systematization, practice and assessment of intellectual work skills) and **hybrid system** (besides using the adequate equipment and the face-to-face interaction, it is necessary to use technologies for the act of teaching-learning in the online environment).

General skills: - Adequate use of terminology and specific languages to know the equipment for the movements of the device;

- Understanding the role of dramaturgical use of apparatus movements;

- Recognize the types of equipment and technical means used for the various movements of the device (in a single plane or complex).

Specific skills:

- Knowledge of the types of equipment and technical means for the movements of the device in a single plane;
- Knowledge of constructive details and their role in the use of trolleys for horizontal filming;
- Knowledge of the types of equipment used for complex device movements;
- Ability to differentiate the types of equipment and technical means used for different movements of the device.

Operational objectives:

Cognitive:

O1: identify traveling trolleys;

O2: Recognize the horizontal movement of traveling trolleys;

O4: identify traveling movements;

O5: differentiate between dolly and traveling strollers;

O6: Recognize the role of filming cranes in performing complex movements;

Training:

O7: Recognize the constructive details of trolleys and treads for single-plane device movements;

O8: identify the basic constructive variants of dolly trolleys for complex device movements;

O9: Know the elements that give mobility to the camera;

O10: Recognize filming cranes;

O11: to know the different ways of operating filming cranes;

Attitudinal:

O12: show interest in acquiring knowledge of equipment and technical means for the device movements.

Values and attitudes:

Demonstrate readiness to apply the knowledge gained about the equipment and technical means used to perform the movements of the device.

Identify the importance of knowing the types of equipment used to perform the device movements.

Strategies: directed, inductive - deductive, explanatory - conversational

Methods:

expository - heuristic: M1 - explanation; M2 - heuristic conversation;

interactive: M3 - “learning through discovery”; M4 - demonstration; M5 - experimentation; M6 - comparison; M7 - brainstorming; M8 - problematization.

Assessment: informative (notions and classifications regarding the equipment used to perform the device movements) and **formative** (acquisitions of new knowledge about the equipment for the device movements, correct use of specialized language, ability to synthesize and analyze, ability to use the equipment to perform device movements in a given context / application.

Assessment tools: oral verification; systematic observation; individual and / or group project.

Forms of organizing the activity: face-to-face, independent and in groups.

Material resources:

- Video or motion picture movies
- Video camera
- Computer with high- speed internet access
- Video camera usage patterns
- Digital blackboards
- Smart devices, cables and specific equipment
- Specialized laboratory

Resources: human: 20 students

time: 50 ′

materials: - official: m 1 Curriculum for the respective subject (Film)

m 2 Didactic macro-design;

m 3 Design of learning units and laboratories

m4 The manual

m5 Methodological guide

Unofficial: m 6 - Worksheet 1

Annex 1

FEED-BACK SHEET

I. Describe traveling trolleys

II. Identify the differences between traveling strollers and dolly strollers.

III. List the operating modes of the equipment used to perform complex device movements and give a brief description of each.

Working time: 20 minutes

LESSON FRAMEWORK

Education Unit: Colegiul Tehnic MEDIA

Teaching Unit:

Teacher :

Class :

Date :

Lesson: Lightning

Type of lesson: mixte (acquisition of knowledge, systematization, practice and assessment of intellectual work skills) and **hybrid system** (besides using the adequate equipment and the face-to-face interaction, it is necessary to use technologies for the act of teaching-learning in the online environment).

General skills: - Appropriate use of specific terminology and languages to learn the technical possibilities of lighting devices;
- Understanding the role of lighting styles in obtaining the desired artistic effect;
- Recognize the specific notions used for lighting (contrasts, shadows).

Specific skills: - Knowledge of the types of shadows used in lighting technology;
- Identifying lighting styles;
- Knowledge of the specifics of each type of shadow;

- Ability to differentiate the types of light according to the shadows and contrasts produced.

Operational objectives:

Cognitive:

O1: to define the term shadow used in the lighting technique;

O2: to know the specifics of each type of shadow;

O3: to know the types of contrasts;

O4: to define the notion of “lighting bill”;

Formative:

O5: to recognize the types of shadows produced by different lights;

O6: to recognize differences in contrast;

O7: to identify how artificial lighting complements natural lighting to increase dramatic effect;

Attitudinal:

O8: to show interest in acquiring knowledge about the plasticity of lighting;

O9: to show interest in acquiring knowledge about the role of shadows and contrasts in frame lighting.

Values and attitudes:

Manifestation of willingness to apply the knowledge acquired about the plasticity of lighting

Identify the importance of knowing the types of shadows and contrasts

Strategies: directed, inductive - deductive, explanatory – conversational

Methods:

expository - heuristic: M1-explanation; M2- heuristic conversation;

interactive: M3 - "learning through discovery"; M4 - demonstration; M5 - experimentation; M6 - comparison; M7 - brainstorming;

M8 - problematization

Evaluation: informative (notions and classifications regarding the plasticity of lighting) and **formative** (acquisitions of new knowledge about the plasticity of lighting, correct use of specialized language, ability to synthesize and analyze, ability to use the sahdows and contrasts in a given context / application).

Assessment tools: oral verification; systematic observation; individual and / or group project.

Forms of organizing the activity: face-to-face, independent and in groups.

Material resources:

- Printed and digital images / photos, media such as magazines, newspapers, websites
- Camera, photo editing software
- Computer with high speed internet access
- Digital blackboards
- Smart devices, cables and specific equipment
- Specialized laboratory
- Videos / movies
- Videocamera
- Different lighting sources (projectors, reflectors, etc.)

Resources: human: 20 students

time: 50 ′

materials: - official: m 1 Curriculum for the respective discipline (Film)

m 2 Didactic macro-design

m 3 Design of learning units and laboratories

m4 The manual

m5 Methodological guide

– unofficial: m 6 - Worksheet 1

Annex 1

FEED-BACK SHEET

I. Describe the types of shadows depending on the plastic character.
II. Define the lighting contrast.
III. Explain the notion of "lighting bill".

Working time: 20 minutes

LESSON FRAMEWORK

Education Unit: Colegiul Tehnic MEDIA

Teaching Unit:

Teacher :

Class :

Date :

Lesson: Sources for artificial lighting - Incandescent lamps

Type of lesson: mixte **(acquisition of knowledge, systematization, practice and assessment of intellectual work skills) and** hybrid system **(besides using the adequate equipment and the face-to-face interaction, it is necessary to use technologies for the act of teaching-learning in the online environment).**

General skills:

- Adequate use of specific terminology and languages to explain artificial light sources; - Understanding the differences between natural light sources and artificial light sources;

- Recognition of incandescent lamps;

- Understanding and recognizing the fields of use of artificial light sources.

Specific skills:

- Defining the light source - incandescent lamp;
- Knowledge of how the incandescent lamp works;
- Recognition of the component parts of the incandescent lamp;
- Ability to choose the appropriate artificial light source for indoor filming.

Operational objectives:

Cognitive:

O1: recognize the types of incandescent lamps used in cinematography;

O2: identify the characteristics of the incandescent lamp;

O3: explain the operation of the incandescent lamp;

O4: to know the devices that use incandescent lamps: reflectors, projectors, intelligent lights;

Formative:

O5: to identify the incandescent lamps after their constructive realization;

O6: Recognize the field of use of incandescent lamps;

O7: to differentiate incandescent lamps by their electrical power;

O8: identify the most advantageous sources of artificial lighting according to their economic efficiency;

Attitudinal:

O9: show interest in knowing the sources of artificial lighting - incandescent lamps.

Values and attitudes:

Demonstration of willingness to apply the knowledge acquired about artificial lighting devices used in photo-video-cinematography

Identify the importance of choosing artificial lighting fixtures (incandescent lamps) suitable for indoor filming

Strategies: directed, inductive - deductive, explanatory – conversational

Methods:

expository - heuristic: M1-explanation; M2- heuristic conversation;

interactive: M3 - "learning through discovery"; M4 - demonstration; M5 - experimentation; M6 - comparison; M7 - brainstorming;

M8 – problematization

Assessment: informative (notions and classifications regarding lighting sources and equipment) and **formative** (acquisition of new knowledge about artificial lighting sources, correct use of specialized language, ability to synthesize and analyze).

Assessment tools: oral verification; systematic observation; individual and / or group project.

Forms of organizing the activity: face-to-face, independent and in groups.

Material resources:

- Images of artificial light sources

- Computer with high speed internet access
- Schematics of lighting fixtures used in photo-video-cinematography
- Reflectors, projectors, light mixer for smart lights
- Digital tables
- Smart devices, cables and specific equipment
- Specialized laboratory

Resources: human: 20 students

time: 50 ′

materials: - official: m 1 Curriculum for the respective discipline (Film)

m 2 Didactic macro-design

m 3 Design of learning units and laboratories

m4 The manual

m5 Methodological guide

– unofficial: m 6 - Worksheet 1

Annex 1

FEED-BACK SHEET

1. Describe the characteristics of the incandescent lamp.
2. Identify the types of incandescent lamps used in photo-cinema.

Working time: 10 minutes

LESSON FRAMEWORK

Education Unit: Colegiul Tehnic MEDIA

Teaching Unit:

Teacher :

Class :

Date :

Lesson: Sources for artificial lighting - Discharge lamps

Type of lesson: mixte **(acquisition of knowledge, systematization, practice and assessment of intellectual work skills) and** hybrid system **(besides using the adequate equipment and the face-to-face interaction, it is necessary to use technologies for the act of teaching-learning in the online environment).**

General skills:

- Adequate use of specific terminology and languages to explain artificial light sources;
- Understanding the differences between natural light sources and artificial light sources;
- Recognition of discharge lamps;
- Understanding and recognizing the fields of use of artificial light sources.

Specific skills:

- Defining the light source - the lamp with discharges in gases, vapors, metal halides;
- Knowledge of the types of lamps with discharges;
- Recognition of lights and shadows produced by different types of discharge lamps;
- Ability to choose the appropriate artificial light source for indoor filming.

Operational objectives:

Cognitive:

O1: to recognize the types of lamps with gas and vapor discharges;

O2: to identify the field of use of discharge lamps according to the discharge medium;

O3: to explain the principle of operation of mercury vapor and metal iodine discharge lamps;

O4: to be familiar with devices that use discharge lamps;

Formative:

O5: to identify discharge lamps by the nature of the discharge medium;

O6: to recognize the field of use of discharge lamps;

O7: to differentiate the light effects produced by the different types of discharge lamps;

O8: to identify the shadows produced by the light of fluorescent lamps mounted in reflectors;

Attitudinal:

O9: to show interest in knowing the sources of artificial lighting - discharge lamps.

Values and attitudes:

Demonstration of willingness to apply the knowledge acquired about artificial lighting devices used in photo-video-cinematography

Identify the importance of choosing artificial lighting fixtures (discharge lamps) suitable for indoor filming

Strategies: directed, inductive - deductive, explanatory – conversational

Methods:

expository - heuristic: M1-explanation; M2- heuristic conversation;

interactive: M3 - "learning through discovery"; M4 - demonstration; M5 - experimentation; M6 - comparison; M7 - brainstorming;

M8 – problematization

Assessment: informative (notions and classifications regarding lighting sources and equipment) and **formative** (acquisition of new knowledge about artificial lighting sources, correct use of specialized language, ability to synthesize and analyze).

Assessment tools: oral verification; systematic observation; individual and / or group project.

Forms of organizing the activity: face-to-face, independent and in groups.

Material resources:

- Images of artificial light sources

- Computer with high speed internet access
- Schematics of lighting fixtures used in photo-video-cinematography
- Reflectors, projectors, light mixer for smart lights
- Digital tables
- Smart devices, cables and specific equipment
- Specialized laboratory

Resources: human: 20 students

time: 50 ′

materials: - official: m 1 Curriculum for the respective discipline (Film)

m 2 Didactic macro-design

m 3 Design of learning units and laboratories

m4 The manual

m5 Methodological guide

– unofficial: m 6 - Worksheet 1

Annex 1

FEED-BACK SHEET

1. Compare the light produced by fluorescent lamps with that produced by mercury vapor and metal iodine discharge lamps.
2. Identify the field of use of high pressure xenon discharge lamps.
3. Describe the operation of a metal halide lamp.

Working time: 10 minutes

Module 22 – the plasticity of lighting

- **Principles of lighting;**
- **Shadows;**
- **Light contrast; Luminance contrast;**
- **Lighting bill.**

PRINCIPLES OF LIGHTING

The artistic aspect of lighting is based on a good knowledge of the characteristics and technical possibilities of lighting devices, the billing and lighting styles as well as the notions of photometry and exponometry. The plasticity of lighting deals with the technical field bordering on the art and technique of lighting.

SHADOWS

Any object illuminated with a single light source produces shadows, determined by the relative position between the source and the object, as well as the lighting bill. Each light source produces its own shadows, independent of the shadows produced by other sources. Shadows are classified as follows:

- Depending on the position relative to the illuminated object:

• its own shadow on the surface of the object opposite the light source;
• the shadow cast on the support surface of the object;
• the cast shadow on a vertical plane (wall) near the object,

➢ Depending on the shadow outline drawing:

• harsh shadows, obtained from light sources with small apparent dimensions;
• soft shadows, obtained from light sources with large apparent dimensions.

Intermediate design shadows are obtained from intermediate sources, and have the appearance between soft shadows and hard shadows. The central area of these shadows, darker, is called the ***shadow itself***, and the marginal area is ***semi-shadow***.

➢ Depending on the plastic character:

• deep shadows, which are hard shadows, without semi-shadows, being dark enough not to distinguish details in the shaded area;
• patterned shadows, which are shadows with a hard or soft design, but bright enough to distinguish details throughout the shaded area.

Usually, modeled shadows are obtained by additional modeling lighting. The light that produces harsh shadows is called ***directed light***. The light that produces soft shadows is called ***diffuse light***.

LIGHTING CONTRAST

LUMINANCE CONTRAST

The human eye and the photosensitive film / image sensor record the images of the targeted scenes, as a result of the light reflected by the surface of the objects in the direction of observation, respectively as a result of their luminance.

Two or more illuminated surfaces may have different luminance, either as a result of different illumination or as a result of different reflection coefficients. If two surfaces receive two different illuminations, the illumination contrast represents the numerical ratio of the illumination values received by it.

Although the luminance contrast has a more comprehensive character than the illumination contrast, both notions are used, correlated with the exponometric measurement methods.

LIGHTING BILL

The extreme luminance contrast at which the eye can notice details in strong shadows and lights, is achieved with appreciable effort on the part of the eye.

The "visual comfort" area includes luminances in a much lower ratio. Psychologically, a scene illuminated so that the contrast of luminance is within the visual comfort zone creates a feeling of calm, compared to a scene with high luminance contrast, which conveys a feeling of discomfort, embarrassment, irritation.

Natural lighting on sunny days produces a contrast of lighting high enough to be at the upper limit of visual comfort. Thus, the shadow modeling effect was taken over by artificial lighting.

By lighting bill, we mean those particularities of lighting, meant to create a contrast of lighting and a bill of shadows, corresponding to the proposed dramatic purpose.

Module 23 - Artificial lighting sources - Incandescent lamps

- **Artificial light sources**
- **Incandescent lamps - Constructive criteria**

ARTIFICIAL SOURCES OF LIGHT

For indoor filming, artificial light sources are needed, because the filming sets do not have windows, they are blind rooms. Even when filming in homes or businesses, sunlight entering through windows is not enough and therefore artificial sources are required.

The most used artificial source is the incandescent lamp, a source from the family of light bulbs that illuminate our homes.

Its operation can be explained simply - an electric current, supplied by the network or by a generator / generator group, passes through the filament (composed of tungsten), heats it until it becomes incandescent and emits light accordingly, similar to any well-heated wire.

The body of the lamp consists of a glass balloon, from which the air was removed (sometimes in its place is introduced a mixture of inert gases - nitrogen, argon, krypton, at low pressure). At the lower end of the lamp is a base with metal electrodes, through which the filament is connected to the power supply.

The characteristics of the incandescent lamp are as follows: the electrical power absorbed by the mains (expressed in watts or kilowatts), the supply voltage (expressed in volts), the luminous flux (expressed in lumens), the luminous efficiency (efficiency) (expressed in lumens / watt), lamp service life (expressed in hours), color temperature (expressed in K).

Filmmakers now have a wide variety of incandescent lamps:

- projection lamps, with spherical or cylindrical balloon, transparent, with filament arranged in space after a rectangular surface, built for powers of 300-20,000 W and voltages of 110 and 220V;
- photo bulbs with mushroom or pear balloon, usually matted inside, built for powers of 250 - 500W;
- lamps with a built-in light guidance system (a reflective surface deposited on the lower half of the balloon inside it and sometimes a lens pressed to the front of the balloon so that the light is emitted in the form of a narrower or wider beam); they are built for powers up to 1500W.

The lamps quoted above emit a light with a color temperature of 3200-3400 K, the temperature at which current negative-color films normally work.

INCANDESCENT LAMPS - CONSTRUCTIVE CRITERIA

The construction and operating criteria, the variants carried out, the possible directions of the technical improvements of the incandescent lamps are subject to requirements, as follows:

Economic efficiency. A lamp is an investment consisting of the sum of the costs of purchase, supply of electricity during its duration of operation, maintenance and installation and replacement. During operation, the lamp produces a luminous flux, which decreases from its nominal value to a certain value, due to the deposition on the walls of the balloon of the tungsten particles evaporated from the filament, and to the decrease of the filament mass.

In the lighting technique, in recent years, the so-called halogen regeneration cycle lamps have appeared, because due to their construction, the blackening of the balloon during the operation of the lamp is practically eliminated. Iodine or bromine is introduced inside the flask in gaseous form, which results in a chemical process that causes the tungsten particles to return to the filament, thus avoiding their deposition on the inner walls of the flask.

The constructive realization knows a great diversity of types and variants, starting from a reduced range of nominal powers. Incandescent lamps used in photo-cinematography can be classified according to their destination, as follows:

- projector lamps,
- reflector lamp,
- lamps with built-in reflector.

Module 24 - Artificial lighting sources - Discharge lamps

• Lamps with vapor and gas discharges;

• Fluorescent lamps;

• Discharge lamps;

• Metal halide lamps.

LAMPS WITH GAS AND VAPOR DISCHARGES

Lamps with gas and metal vapor discharges, used in photo-cinematographic lighting, are classified according to the nature of the discharge medium as follows:

- tubular fluorescents, with low pressure mercury vapor discharge;
- fluorescent, with discharge in mercury vapors at medium pressure;
- with mercury discharge with additions of metal iodines;
- with xenon discharge with continuous operation;
- lightning with xenon-argon discharge.

FLUORESCENT LAMPS

Tubular fluorescent lamps and fluorescent lamps with medium pressure mercury vapor discharge are commonly used for public lighting. The spectrum of fluorescent tubes and lamps is compared to poorer sunlight in green-yellow, yellow-orange and extreme red, distorting the colors of objects.

The light produced by such lamps mounted in reflectors, produces soft shadows, with very bright semi-shadows, leaving the impression that no artificial lighting was used.

The appearance of professional tubes allowed the cinema lighting to enter another stage of development. The type of tube determines the color temperature.

Any lamp model can be quickly modified to switch from daylight to incandescent light by simply changing the tubes.

DISCHARGE LAMPS

The mercury vapor and metal iodine discharge lamps were developed by attempts to correct the unsatisfactory emission spectrum of fluorescent lamps, being originally built as variants of medium pressure mercury lamps. In addition to the priming gas and mercury, amounts of thallium iodine, indium, sodium, thorium and dysprosium are introduced. The iodine dissociates in the center of the discharge column and recomposes on the walls of the quartz tube.

Since the added iodine also produces a discontinuous emission spectrum, those combinations that emit in the areas of maximum sensitivity of color films and photo-capturers have been chosen. The 2000 W lamp is equivalent to a 7000 W incandescent lamp. The color temperature of 3500-3800 K allows the light produced to be mixed with the incandescent light during indoor filming.

High-pressure xenon discharge lamps with continuous operation are widespread especially as sources in projectors, and more recently in the technique of cinema lighting. The interest in xenon discharge was first aroused by P. Schulz in 1944, following the discovery of its almost continuous spectrum and high-performance white light.

Although they have interesting lighting and technical characteristics, the power supply and priming circuits make them difficult to operate. The lamps are used for sunlight, lightning, background projection and tracking projectors. Discharge lamps between two metal electrodes, inserted in a high-pressure xenon-containing balloon, enjoy a wide field of application in the technique of cinematographic projection.

Recently, discharge lamps have been introduced in the lighting technique in a gas consisting of high pressure mercury and metal iodine, lamps characterized by a high luminous efficiency (3-4 times higher than that of common incandescent lamps).

METAL HALOGEN LAMPS

HMI lamp (Hydrargyrum medium-arc iodide) or medium-length metal halide gas discharge lamp, made especially for film and television. Hydrargyrum comes from the Greek name for the element mercury. Unlike traditional lighting sources that use incandescent bulbs, HMIs need electric ballasts, which are separated from the lamp body by a cable. The lamp works by creating an electric arc between the two electrodes inside the bulb that excites the mercury vapor under pressure and the metal halides and offers a very high light power.

Unlike ordinary incandescent halogen lamps, in which a halide gas is used to regenerate the filament and prevent evaporated tungsten from darkening the glass, mercury vapor and metal halides in HMI lamps are those that emit light.

MSR / HR (Medium Rare-Earth Source) lamp - the main novelty of this new lamp was the use of a single base that grouped the two connecting pins, while with the original HMI lamp, the pins were arranged on opposite sides of the lamp.

Erasmus+

www.rtv-erasmusproject.eu