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

Guidelines for

Education for Conference Hosts

(Curriculum)

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

Content

Innehåll

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

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

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

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

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

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

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

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

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

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

Introduction

In the future the need for competent staff at enterprise- and conference establishment that can handle communication system that includes images, sound and light, will increase. The educational development in these communication systems are under a strong progress, it could be the environment that is mirrored through the different media, or the educational setup that is used at conferences or distance learning.

By increasing the competence of the conference hosts the conference participants' experience will e increased. Whether or not the conference is through distance or face-to-face there is a huge need to increase the knowledge of those who implement conferences. Conference engineers are often good in one area; sound, light, images or computers but seldom the one who is the host. It is very rare with engineers who have good knowledge in all areas. If we enhance the knowledge in this area we will be able to create a profession with larger competitiveness at the labour market field.

The multi-competent conference host who also is an engineer rarely exists today. The project aims to build a foundation for a new profession that can through its competence and wide knowledge become desired at the labour market field. Freelance opportunities are also increased for the profession.

The progress of technical solutions moves faster and faster. With today's technology you are able to control sound and light establishment through e.g. tablets. This development makes it easier for one person to handle all the moments at a conference. It is today possible to during a conference to circulate and host and at the same time handle sound, light and images from a brought tablet.

A conference engineer's work is to greet the customer at the conference establishment and to satisfy the customer's requests. An initial contact happens before the conference arrives to the setting where requests about sound establishment, light, video projections etc., are carried out. The person who handles this contact is often a producer, who in cooperation with the engineer reviews what the conference will need. It is often different lecturers that are invited and therefore, it is difficult to know what every lecturer is really going to need. It is not unusual that one microphone quickly becomes four or that it suddenly is a request for video projection. To work quickly and efficiently and gather all knowledge from all engineers becomes increasingly necessary to be able to work effectively and to satisfy the customers.

Engineers often put on the headsets, hand out wireless question microphones, see to it that the computer is connected to a projector, mist the light if necessary, and see to it that all things work optimally and at once. Today many engineers are often used for these operations which is both expensive and ineffectively.

The course aims to gather this knowledge from the participants so that they will learn what possibilities that exists now. It is impossible to learn all the systems but it is possible to learn how the modern system works and therefore, quickly learn the new system when they dive into work. Everybody should know

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

how sound/light/images can function and it makes it easier to understand what can be done with a certain system.

Often temporarily establishment is set up in a facility which might not originally have been thought of as a conference facility. To know what kind of sounds systems there are, how they work and when they are optimal to use is knowledge that a conference engineer must have. It is not certain that the conference establishment owns the equipment needed themselves and therefore have to sometimes rent to complement their own. To know then what kind of equipment is needed eases the work and reduces the risk to be tricked by unreliable renters.

Since different lecturers have different voices they will also sound different. To be able to quickly “fix” a sound to increase the speech clarity and make it easier for the conference participants to understand what is said is necessary. Thus the participants must understand and have knowledge about what can be done with a sound and how to quickly change its character so that the clarity terms are reached.

In a conference facility is visibility another thing that also is much important. To be able to see the lecturer well creates contact and security. With simple means it can also be created different atmospheres which can strengthen the message that the lecturer has. To know these and to be able to quickly discuss with a lecturer can be the difference between a good lecture and a fantastic lecture. The general light in the facility also creates an atmosphere that easily strengthens the message that the conference organizer wants to convey. To be able to easily and effectively change it will create good prerequisites so that the organizer will return to the same conference establishment again.

Unfortunately,sometimes things does not work as you want.. A conference engineer’s work consist of days where things go wrong. To be able to quickly make a decision about a procedure and see to it that the customer is still satisfied is not the easiest thing. Therefore basic knowledge in each of the course’s different moments is needed so that problems are quickly taken care of. A backup plan should always exist in case an accident occurs.

Sound – basic knowledge about sound both theoretical and practical – how sound works in theory and in practice, how the facility affects the sound, possible phase faults etc.,

Knowledge about sound is needed so that the event technicians/engineers better can understand what is going to happen and what might possibly go wrong. It is also important to know so that a troubleshooting can be done in an effective way. Since the different facilities affect the sound differently it is important to know what can be done, e.g, clarity of speech and what can’t be done. As an event technician at conference establishments it is important to understand both what can happen with reinforced sound but also how sound works acoustically. The basic sound knowledge is important for fulfilling future customers’ request of a successful event. A stable and fundamental basic knowledge will make the engineers confident in their profession, to trust more in themselves and their hearing and thus be able to achieve better in their work.

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

Choice of right sound establishment for the facility – how point-source and linearray principle works, what sound establishment is needed for the purpose and what differs the different PA-types from each other. How to adapt the establishment for the right purpose. Distribution angles.

To use the right establishment to cover the facility so that everyone can hear well is essential so that the event can be a good experience for the participant. To put a line-array in a small facility probably is unnecessary since a point-source-speaker does the same thing better and easier. Problem with acoustic feedback will then be different and it is also something that should be taken into consideration when choosing the equipment. A big facility has other possibilities compared to a small. The shape of the facility, difference in height, symmetry, etc., will also matter in how the sound comprehension will be. Therefore it is important that the engineer is well-settled with different sound systems so that the establishment is well-considered to the terms of the facility. A conference establishment can have limited sound establishments and budget can also make it difficult to rent and complement. A well-established knowledge of sound establishment gives the engineer good opportunities to answer to the customer's requests, even with a limited budget. Sometimes speakers want to hear themselves in some form of monitor. Choice of monitor and its placing and sound intensity will affect the risk for acoustic feedback. It will also make some speakers more secure and some speakers finds it uncomfortable to hear themselves. Communication with speakers are, of course, necessary but understanding how the speaker is affected should be done quickly and possible monitor problems should be fixed.

How close to a speaker can an introducer be? How strong will it play? How do we cover the facility, in the best way, with minimal equipment?

Microphones – walkthrough of the different types of microphones there are, dynamical, capacitor, electret etc., and their field of application and differences. Theoretical and practical walkthroughs.

Headsets are almost always electret microphones. Question microphones that are passed around in the audience are often dynamical. Engineers must have dependable knowledge about how microphones sound and how they should sound. It has to be easy to hear if something is wrong and if the fault can be corrected easily or if the microphone should be replaced. How different microphones sound and how they should "sound" is knowledge that makes it easier to recognize different issues that can arise. The same voice can sound differently in different microphones. A good knowledge about varied microphone characters will make it easier to choose which microphone suits a certain voice better. The placing of the microphone will also affect how the sound sounds and how strong it becomes. Since it often is the same microphone to different persons and quick changes the distance can vary and therefore also sound intensity, speech clarity, characters etc. How can the engineer see to it that the sound image is similar to the various types of microphones? How should the microphone be best placed in order to receive the best speech clarity, at the same reducing puff sounds and other discords? How big is the difference when the distance to the sound source is increased and what happens with the risk for acoustic feedback?

Mixing panel – walkthrough about analogue and digital mixing panels, differences between them and how to handle them. Theoretical and practical walkthroughs.

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

Analogue mixing panels are almost on its way back but it is important to know how they work. Partly because they are the foundation to the digital mixing panels but also because future event engineers can run into an analogue panel in his/her work and they can't stand helpless. Digital panels offers an infinite amount of functions. To know exactly how all mixing panels work today is impossible because the digital revolution has made that mixing panels differ a lot from each other. Although, the engineer must have well-established knowledge in which function that always exists. By having a good foundation in mixing panel knowledge the engineer will easily understand an unknown mixing panel and quicker understand how it works. Mixing panel knowledge makes it easier for the engineer to quickly do and change settings during an on-going conference. To understand how modern tools such as tablets can be used in combination with mixing panels makes the engineer able to manage his/her work while being on different places in the facility. The tablet as a tool is today a powerful tool which makes it easier to do several things at once and an important extension between the engineer and the mixing panel. Correctly used various affects can result in a much better end result which will provide satisfied customers. It is important to really understand these effects, how they are used and which are important to scratch or use when time is limited.

Which are important when the schedule is pressed? What sequence should I use for different effects if there is time for a longer sound check? How much do I dare to change the sound when a conference is on-going? Should I save the settings for each person if they come back and talk more?

Effects – digital and analogue effects like EQ, compressor, Gate, Reverb, Delay etc., where you use these and how they work practically. How these tools help us engineers.

Attach closely to knowledge mentioned above. Some effects will really make a huge difference when it comes to speech clarity and comprehension. As an engineer it has to move fast when you have to decide how a certain voice can be changed and improved. Speakers sound different, some mumbles, some speak strongly and others weakly. Time moves fast during conferences and there is seldom time to check how different speakers sound before the situation is serious. As an engineer it is quick decisions that have to be made and they also have to be the right decisions. First to get a mumbling speaker to sound clearer and then quickly get a weak speaker to sound stronger and not over explicit demands good knowledge. It is important that you as an engineer feel comfortable and well-settled with the different effects that are available. Which effects can we actually get use from? Which should we ignore? Today even automatic effects does that voice mixing can be handled automatically through some mixing panels, e.g., discussion forums. What is important to have time for in an EQ if the schedule is time pressured?

Wireless signals – microphones and other wireless equipment that could be needed at conferences. Disturbance, how and what one should think of while using wireless equipment. Theoretical and practical walkthroughs.

At large, all conferences and events use wireless equipment. How it works and what rules apply is important to know about since ignorance can result in discord and disturbance and in the worst scenario, result in breaking the law. That disturbance can occur is known and as an engineer you should have knowledge about this and how/if it can be fixed. If there are other on-going conferences in adjacent

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

facilities the engineers must talk together and see to it that the same frequencies are not used in the other facilities. Sometimes the facilities are large and in need of extra antennas to avoid disturbance. Antennas can be connected in various ways and their placing will make the connection better. A badly placed antenna can lead to big disturbance issues and in the end, an unsatisfied customer. How does it work and what rules apply when we use wireless equipment? When can disturbance occur? How close to each other can the frequency tapes be? How do I know what frequency an establishment has if it is unmarked? What kind of measuring equipment should I use if I want to know what frequencies there are in the area, that are used and that would cause disturbance? Can wireless DMX and wireless equipment disturb each other and what should I do to avoid this problem?

Set establishments against mobile establishment – differences of these various sound establishments, pros/cons, what PA you should use to receive a clear voice, differences in various loudspeaker sizes and what you should keep in mind.

Connects back to point 2. Right establishment to right facility. As an engineer on a larger conference establishment it can most likely exist set establishments. The set establishment becomes a stable foundation but can also become an issue. It is easy to get stuck in how it sounds at a specific establishment, and later when the engineer works with another establishment or a similar establishment you can easily get stuck because you remember how it sounded in the establishment that you are used to work with. Conference engineers must know their set establishments, their strengths and weaknesses. If conference participants are placed behind a set PA-establishment it needs to be complemented with a mobile so that everyone can hear and participate. The mobile establishment can, however, bring a time fault into the set establishment which could cause that the sound suddenly cannot be heard properly. As an engineer, you need to be able to determine if the set establishment is the best thing for this conference or if it would be better to bring in a separate smaller establishment so that e.g., you can keep the volume down and create a more intimate atmosphere. In what way does a set establishment reach the audience in a better way? What are the difficulties with a mobile establishment and what is the best way to place it so that it covers as much as it can of the audience? If the engineer need to use several mobile establishments to cover a facility, how do I delay the system so that they get into phase with each other? How do I do the corresponding if I need to complement a set establishment?

Cabling and troubleshooting – differences between the various cables that are used for sound, RCA, Speakon, XLR, TELE and where they are used, how to easily repair these or make new cables.

To know the difference between cables is a must when customers request it. Disturbance, discord can occur and worst of all danger of life if the wrong cable is connected to the wrong thing. Often the engineer is well-settled with his/her own cables but sometimes there are new things that arrive when you, e.g., rent a complementing establishment. Connecting all things that you have rented should be done quickly and time should not be laid on wondering what an unknown cable is used for. Some equipment, brought by the speaker, can sometimes not be connected without causing cable issues. As an engineer, it is important to know in advance what needs to be checked and prepared but also to be prepared to face issues that can arise in a moment. Which cables are used for which equipment? What

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

cabling will you run into? What are the differences between balanced and unbalanced equipment and extension of cabling? How do I balance an unbalanced signal? How do I avoid to use the loudspeaker cable as a signal cable and the other way around? How do I tell the two cable types apart?

Digital and analogue equipment – standard today and where the profession is headed, historical perspective on today's equipment.

Good knowledge to understand the situation of today and at the same time understand what will happen in the future. It will make it clear for the participants the importance of keeping up-to-date with new technology and not getting left behind. As a conference engineer it can easily happen that you use the same equipment year after year. When you can't use the equipment anymore you need to buy new. If you as an engineer in that moment don't know what has happened it can be an enormous ascent when you need to learn about new equipment. If you, on the other hand, see to it that you are updated and visits branch fairs it is easier to change equipment without the feeling of climbing an enormous mountain. It also makes it easier to quickly find new equipment for your workplace.

Basic light composition – how light works theoretical and practical, thoughts, ideas and aims where we want to go with the light.

Basic knowledge that must be understood before you can move on with the rest of the course. To understand the basics in how light works are essential to be able to perform a good light composition. It is important to understand how coloured light doesn't blend like colours on a paper. To understand how the eye comprehend light and how it affect our comprehension about things is something of importance for an engineer so that he/she can be able to create a good experience and atmosphere for conference participants.

To light composite a facility – what you should focus on and what do you want to receive with the light, how can we use the light in the best way to achieve a pleasant environment for conferences?

Different events will demand various things. Sometimes a conference wants to create intimacy and therefore make the facility smaller and cosier. Sometimes you want to instead create the feeling of a very large facility. The light will help the engineer to satisfy the customer so that the right effect can be reached. If the conference request effects, colour light, mobile light etc., the engineer must quickly understand what can be done and what way is the best way to make it. A small facility will need a different kind of light composition, a larger facility another one. The important is the knowledge that is needed of how to best use a facility in an optimal way. In what way can the event engineers heighten the experience for the conference- or event participant? What happens with colours when we illuminate with coloured light? How do we avoid that light appears on a movie screen that is probably used during the conference? How do we use different facilities in the best ways?

Choice of right equipment regarding facility and power consumption – theory and practical work with light, power consumption, safety fuse, safe cable installation, electrics.

Different lamps spread light in various ways and they will also in various range create heat. In a small facility the wrong light source can increase the heat in the facility which often is unnecessary and directly

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

unsatisfying. A small facility also has a smaller power station and therefore must use energy-saving lamps, today often LED. A large facility with high ceiling height is not affected by the same problems but at the same time powerful lamps can devour a lot of energy which can lead to increased costs. Besides that, from a sustainable development perspective, it is not always to recommend. Knowledge about various light source, their amount, spread and range. How much does various lamps pull today? What armature is practical to work with? How many lamps are needed to cover a stage? How do we avoid lamps that sound too much?

To create the general appearance and comfort – how we with the help from light can affect the atmosphere, comfort and well-being in facilities.

It is important that conference/event participants have a good experience. The light matters a lot for the general comfort. Everybody knows how impersonal and boring e.g., luminous tubes can be. How we avoid such feelings and how we create harmonic and well-balanced light compositions is an important part for the creation of a good conference with something extra. What happens with the different things that are illuminated in various ways is important to know. It also helps the engineer to dismiss ideas from customers that will create a bad impression. Meanwhile the engineer's knowledge will give the opportunity to come up with suggestions to the customers of light compositions that can create something extra particularly for their conference/event. There is a lot of psychology in light compositions that is important for the engineer to use and know about.

Effect handling – handling light effects, both practical and theoretical.

Today even the simplest light panel, with the help from a computer, can create interesting effects. Effects can make something special, especially at the start of a conference and at the end. Too much of the good stuff can result in a confused and chaotic impression. Too little can make a boring atmosphere. Mobile armatures, that are often used, are heavy economically. The customer must know that a complicated light composition with mobile light will cost a lot of money. Therefore it is important that the engineer knows what can be made according to the budget that the customer can afford. Sometimes it can't be done something special, you have to choose the alternative that's simple and cheap. If the customer wants something that is out of the ordinary light and how do we see to it that the customer receives it? How much time should be put on this and how important is it? Effects can strongly result in making a consummated experience but it can also, very easily, become too much.

Digital light tables – handling digital light tables, theory and practical work.

To be able to create something special you must have a light panel today. You can, of course, just light the lamps in the ceiling but it often creates a dull and ordinary impression. Many conference establishments have today their own light tables while others rent what is needed based on the customer's requests. As an engineer you need to be aware of what the customer aims for and what light panel that is needed to be able to implement what the customer wants. As it is with digital mixing panels light tables are different from brand to brand. You have to quickly understand how it works and what could be achieved from it. Many tables offer today software types that can be downloaded, for free, for

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

practice and training. In that way an engineer can prepare most of it before the actual set takes place. It saves both time and money. Necessary knowledge to be able to work with light today.

Handling colours – colour composition and how colours affect facilities, comfort etc.

To know how various colours affect us is necessary to be able to create an atmosphere that the customer will feel enjoy. It is important in a conversation with the customer to argue for which colours that work and which colours that doesn't. To be able to express various feelings can be very important for the customer since it can affect the whole experience of the conference/event. When, for example, an apple is illuminated with different colours the apple will appear differently. If you want to create a natural impression white light is often to prefer but might not always be the best. In the same way shadows will be created when coloured light and white light coexist. As an engineer it is important to know what the customer wants and how to supply it in the best way. It is also important to know how to, in a good way, fend off things that will create a bad result.

Problem solution – where to start trouble shooting for possible issues.

To be able to quickly find faults and fix these is crucial knowledge for an event engineer. Even in the best of worlds problems can arise. To quickly analyse what has happened and come up with a solution that will make the customers less discontented than if a longer extension had been created. When the sound wrecks or the light doesn't act like it should the engineer has to keep calm and effectively find the problem and the solution for it. A problem that arises once cannot arise again if it can be avoided.

Cabling – DMX, socapex and other cabling that are used for light composition. Functions and good-to-know.

Of course engineers need to be aware of what cables that are used for light. When light is rented you must set it up quickly and effectively and therefore know what solutions saves time and money. Sometimes the things that are requested are not available and then the engineer must have an alternative solution that is not costly or time wasting. What cables do we run into? What are the differences between sound- and light cabling. What cables can be used to connect power in various amounts?

Light, music and sound cooperation-

To create an atmosphere at the start of conferences or as a background at various events can, once again, enhance the experience for the participants. Sound and light together can create amazing experiences out of the ordinary. As a conference engineer you have to feel safe with these possibilities which will result in more satisfied customers that, hopefully, will return. To quickly be able to create an atmosphere based on a music choice and let the music and light coexist in harmony is a competence that every conference engineer should have.

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

Tasks Distribution

UCAM, Spain

Managing video formats: How different video formats work, advantages/disadvantages, conversion

Resolution: choosing the right resolution for the purpose (for ex. For web publishing, use in a PowerPoint or demonstrating via video conference platform). How resolution can affect quality of the conference in case of t.ex. bad Internet connection. What problems one can face and how one can handle the situation.

Signal types and Standards: Theory around different signal types, how and where they are used, which one should use and what is the standard today.

Digital conference platforms:

- Using hardware (cameras etc.) to broadcast a conference via Internet. How to set up cameras and other equipment to connect to the computer.

Displays: using big and small displays, adjusting older and new video materials for showing on a display. What format to choose, how the display should be prepared. How to use several displays for demonstrating the same or different video clips. Using bigger displays for demonstrating video.

Video mixer: how does a video mixer work, how to use it, how to get connected, what cables are used and for what.

Projector: connecting and managing big and small projectors, adjusting colours and formats, differences between HDMI and other form factors used to connect to the projectors, wirelss connections to the projectors.

Cameras: how to film a conference, how a camera works, differences in formats and resolutions. Editing older and new video materials with the help of modern software.

Cables and Contacts: HDMI and other types, differences, for what those different types of contacts are used. Troubleshooting. How to do it if something doesn't work, where to start troubleshooting. How does convertors work and how do they affect the video materials to be demonstrated.

Live broadcasting: how to stream over the Internet, what equipment is needed, software and hardware needed, for. ex. cameras.

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

4System, Poland

Basic IT knowledge and computer science: everything from starting a computer to using the major software for both Mac and PC. Difference between Mac and PC's file systems and layout.

Powerpoint/Keynote: How to use PowerPoint, Keynote to produce professional presentations

File formats: Choosing the right file formats for the right task, choosing the right video format for the right task, differences between Mac and PC, resolution (images, video).

External devices connected to the computers: setting up projectors, wireless equipment, sound and video equipment

Managing Images: How image editors like Photoshop work, basics in image editing, for posters and event programs

Media servers: how do they function and how to use media servers, how to get them connected, what media formats to use when using media servers

Digital Conference Platforms: what programs exist, reference materials to learn how the programs/platforms work. Managing the platform from starting to broadcasting/participating in a video conference. How to connect external equipment for ex. cameras etc.

Distance learning: develop/adjust a distance learning platform for the content of the pilot courses within the project.

Svefi, Sweden

Audio:

Basic knowledge about sound in theory and practice

Choosing the right sound system for the assembly room

Microphones

Mixer boards/consoles

Effects

Wireless signals

Stationary sound systems compared to ”concert” sound systems

Cables and Troubleshooting

Digital and Analogue Equipment

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

Lighting:

Basic knowledge in setting up lighting

How to set up lighting in an assembly room

Choosing the right equipment in relation to the room and electricity concumption

To create general atmosphere and comfort

Managing Lighting Effects

Digital light mixer boards/lighting consoles

Managing Colours

Troubleshooting

Cables

Integrating lighting, music and sound

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

BASIC LONG COURSE, PART I

CHAPTER 1: LIGHTING (BASICS, PART I)

DURATION

6-20 hours – but it´s almost impossible to tell how much time is needed. It depends on what kind of lighting equipment is available, if any. We also recommend you to make a study visit. Regardless, it´s not a good idea to hurry as there will be a lot of facts and technical terms that the unexperienced may need to repeat. What's most important here is that all the facts and technical terms are clear before the participant takes the next step. The excercises are also worth repeating.

INTRODUCTION

The overall aim of this module is to help future conference technicians with lighting design by giving them a solid theoretical foundation in stage lighting and teach them how to use the required technology.

First of all, lighting is a way to communicate; to create a certain atmosphere and support "a story", and the technology is the tool we'll use. Once you've grasped the basics you can start being creative!

The basic course is filled with facts, and there'll be plenty of new technical terms for the unexperienced participant to learn. Of most importance is that all the facts are understood and absorbed. That's why it's a good idea to take pauses from time to time and look for further information on the Internet. That's a good way to gain a deeper understanding of the subject and, just as important, to not hurry through the course.

KEY CONCEPTS / KEY WORDS

Fixtures, bulb, lighting console, dmx, dimmer, conventional lights, moving heads, LED, gear, lighting systems controls, signal distribution, electrical connectors, wattage

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

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

OVERALL OBJECTIVES / COMPETENCES

This module is divided into 5 main chapters.

The purpose with these chapters is to teach the participants the basic knowledge required to apply for internships (for example), as well as to teach them the ”language” of the trade. There is a lot more to know and plenty more equipment than what we go through in this course, but the information included here will still be enough to get the participant started.

Summary, lesson 1: Most commonly used fixture types in entertainment

The chapter starts with a short introduction to what lighting design is about and a presentation of the most commonly used fixture types in entertainment. The lights all have different ”personalities” and can be divided in to two groups: conventional and automated lights (LED and moving lights). The goal is to give the participant an understanding of what these lights have in common as well as what sets them apart from each other.

Summary, lesson 2: Different bulb/lamp types

A presentation of different bulb/lamp types used in in any type of conventional or moving lights. The participant will get some background/historical information about the bulbs and knowledge about one very important matter in lighting – the light source.

Summary, lesson 3: Lighting systems control signal distribution basics

A presentation of the most used lighting control signal standards that transmit digital information from lighting controllers to dimmers. The participant will also learn about different connectors, cables and equipment that is used to distribute control signals within lighting- and other system controls.

Summary, lesson 4: Trussing and rigging basics

This chapter starts with an introduction to the rigging tools. The lesson will present the tools, which are commonly used in small- and medium sized productions.

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

Summary, lesson 5: Common electrical connectors (EU) and wattage calculation

The chapter gives knowledge about the basics of electricity and terms to better help the participant understand what he or she is dealing with. One of the most important skills is to know how to calculate the amount of power needed and how to distribute it evenly between phases. The purpose is to avoid electrical danger or damage to the equipment.

OPERATIONAL GOALS

After completion of this chapter the participants:

Will have gained general knowledge regarding common fixtures and bulbs in lighting for entertainment.

Know the main differences between conventional lights and automated devices.

Will have been made aware of some important aspects to be considered when dealing with rigging and rigging tools.

Will understand how to connect the equipment and what kind of control signals should be used to let the devices communicate with each other.

Gain knowledge about the most common connectors used in lighting, as well as how to calculate the amount of power needed and how to distribute it evenly between phases.

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

LESSONS: LIGHTING (BASICS, PART I)

LESSON 1: “The most commonly used fixture types in entertainment“

Participants will receive information regarding what lighting design is about and which light sources (fixtures) are most commonly used. It’s a lot of information, so we suggest you split chapter one into more than one lesson.

AIM AND CONTENTS OF THE LESSONS

The purpose is to teach the participant what kind of fixtures are most commonly used, as well as to teach him or her the ”language” of the trade. There are two main fixture groups: conventional and automated (LED and moving lights). Since the automated fixtures are mainly based on conventional lights, the aim is to make the participant aware of what kinds of conventional lights exist and how they differ from each other. Each of the most common fixtures used in the entertainment industry, both conventional and moving, are presented.

METHODS OF IMPLEMENTATION

There’s a presentation with both text and pixtures and some short excercises to check if the participant has understood the information. There’s also a suggestion to get the lights you have at hand at the company; to examine them and compare them with the facts given in this course. If there are no fixtures at hand, it’s a good idea to make a study visit to, for example, a theatre, a night club, a concert hall, a store or something similar to get an increased understanding of the equipment can be used.

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

EXPECTED OUTPUTS / RESULTS

- Knowledge of different fixtures in entertainment lighting.
- Knowledge of how the fixtures differ and provide different kinds of light.
- Reflections on what lighting design is about and knowledge of the most commonly used fixtures, as well as what their main function is.

DIDACTIC RECOMMENDATIONS

Presentation: Try to provide an enthusiastic and well-structured presentation. If possible, show some real examples of the equipment.

Summary and discussion: Try to be as precise as possible, highlighting the most important aspects that participants must take into consideration. Foster interaction among the participants and raise questions to the participants to check if they understand the concepts they're exposed to. Be prepared to act as a moderator if there are discussions among the participants.

Breaks: It is also important to take a break of around 5-10 minutes before summarising the aspects addressed in the lesson.

PREPARATION AND EQUIPMENT

- Computer
- Internet connection

If you have access to lighting equipment:

- Stage lighting fixtures of all kinds
- Color gel
- Gobo
- Barn doors

If there is no lighting equipment available, it's a good idea to plan a study visit to where there is some. It can be a night club, a concert hall, a theatre or a company that rents out lighting equipment.

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

TIPS AND TRICKS

Set everything up before the lesson starts (especially the technical equipment).

Place the participants in comfortable locations where each participant can see the screen and interact with the others.

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

LESSON 2: “Different bulb/lamp types“

Participants will receive information regarding the most common light sources in entertainment lighting.

AIM AND CONTENTS OF THE LESSONS

The purpose is to give the participants the basic knowledge of what kind of bulbs/lamps are most commonly used, as well as the differences between them. There is a presentation of three different types of light sources: tungsten halogen, arc light and LED.

METHODS OF IMPLEMENTATION

As in the chapter about fixtures, there is a presentation with both text and pictures and some brief excercises to check out if a participant has understood the information.

EXPECTED OUTPUTS / RESULTS

Teaches that different fixtures demand different bulbs/lamps, as well as the different bulbs used.

PREPARATIONS AND EQUIPMENT

- Computer
- Internet connection
- If you have access to lighting equipment: different kinds of bulbs used in entertainment lighting.

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

LESSON 3: “Lighting systems control signal distribution“

In this lesson, the participants are introduced to the ways they can control the fixtures, and how they differ depending on if you use conventional lights and/or automated lights. The participants will learn about the light control signal DMX and other light signal protocols. There's also a presentation of different connectors, cables and equipment that's used to distribute control signals within lighting.

AIM AND CONTENTS OF THE LESSONS

The purpose here is to give the participants basic knowledge of how the lighting console and the fixtures communicate with each other, to present what kind of technology is used, to show which fixtures are most commostly used, and to teach the ”language” of the trade.

METHODS OF IMPLEMENTATION

As in the chapter about fixtures, there is a presentation with both text and pictures and some brief excercises to check out if a participant has understood the information.

EXPECTED OUTPUTS / RESULTS

Teaches that different fixtures demand different bulbs/lamps, as well as the different bulbs used.

PREPARATIONS AND EQUIPMENT

- Computer
- Internet connection
- If you have access to lighting equipment: different kinds of bulbs used in entertainment lighting.

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

LESSON 4: “Trussing and rigging basics“

The participants will receive information regarding rigging and what equipment is used, such as stands, trusses, hoists and other tools.

AIM AND CONTENTS OF THE LESSON

The participant will learn of some important aspects to be considered when dealing with rigging and rigging tools. The purpose is to give the participant basic knowledge of the tools and understanding of the importance of rigging safely. The lesson shows examples of different tools and how they are best used. Rigging rules, laws and regulations vary by country and learning rigging and hanging should always be conducted under supervision of a trained and experienced professional. However, the goal of with the lesson is not to teach the knowledge required for rigging safely on your own, but rather to teach the participant about the most commonly used tools.

METHODS OF IMPLEMENTATION

There is a presentation with both text and pixtures as well as some brief excercises to check if the participant has understood the information given.

EXPECTED OUTPUTS / RESULTS

- Knowledge of different rigging tools in entertainment lighting
- Knowledge that there are different kind of rigging tools
- Comprehension of some important aspects to consider when dealing with rigging and rigging tools

DIDACTIC RECOMMENDATIONS

Presentation: Try to provide an enthusiastic yet well-structured presentation. If possible, show real examples of the equipment.

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

Summary and discussion: Try to be as precise as possible, highlighting the most important aspects the participants must take into consideration. Foster interaction between participants, and between the participants and you. Ask questions to check if they understand the concepts exposed. Act as a moderator in case a discussion between participants occur.

Breaks: It's important to take a break of around 5-10 minutes before summarising the aspects addressed in this lesson.

PREPARATIONS AND EQUIPMENT

- Computer
- Internet connection

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

LESSON 5: “Common electrical connectors (EU) and wattage calculation“

Common electrical connectors (EU), power units and wattage calculation.

Even within EU there is multiple different 230V connector standards used in everyday life depending on the country you are currently at. Luckily the three-phase connectors have standardized to use CEEFORM red connectors which makes touring more easy. On this lesson we will focus on the mid-scale connectors from 16A to 125A as usually from there and up you will have a certified electrian to provide the power for you and breaken down into 125A and down connectors.

CEEFORM connectors

In EU the most common used connectors in heavy commercial and industrial plugs are CEEform red connectors. The EU standard is IEC 60309 standard. In showbusiness this is also the most common heavy connector and the most used PIN setting is 3P+N+E meaning it has three phase connectors, neutral and earth. The voltalge between two phases is 400V and between phase and neutral it is 230V. These connectors come in sizes of 16A, 32A, 63A, 125A and 200A form which the last mentioned is not used in showbusiness.

In some companies and more commonly in UK there is a CEEform Blue single phase connectors used. Their pinout is P+N+E.

Most dimmers from 6ch and up and power distribution centrals have the CEEform connectors for input. The distribution boxes are used to break the CEEform into single phase outlets with 230V.

5-1

5-2

5-3

Figure 0-1, 16A CEEform 3P+N+E wall outlethttp://www.highlite.nl/var/StorageHighlite/ProduktBilder/product_detail/90308.jpg

Figure 0-2, 16A CEEform P+N+E cable http://www.tmx-electrical.co.uk/_stock/medium/116-01.jpg

Figure 0-3, 16A CEEform 3P+N+E connector https://nordiskmusik.se/wp-content/uploads/sites/11/2016/01/90317.jpg

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

German schuko

German schuko (short form from German word Schutzkontakt meaning protective contact) which means that the plug and socket are equipped with protective earth contacts. The schuko is the most widespread standard in showbusiness within the EU. The exeptions are UK, Denmark, France, Italy and Switzerland. The schuko connectors are normally used on circuits with 230V, 50Hz for currents up to 16A.

For exceptions within the EU look from https://en.wikipedia.org/wiki/Schuko

Socapex

In show lighting the most used connector for termination of multicable ends is Socapex connector. The 19-pin configuration allows to transfer 6ch of 16A power. Most up-to-date dimmer units and power distribution units are equipped with panelmount Socapex connectors. The advantage is that you can run 6ch of 16A 230V lines with one multicable, rather than using 6pcs of separate schuko cables. Usually there is breakout boxes or breakout tails to convert from Socapex to schuko.

Socapex are also used to transfer multiple speaker lines for PA and multiple motorized chainhoist powerlines.

Some lighting rigging booms are also equipped with Socapex in (and out) connetors for fast connection of multiple lamps like a PAR-can boom.

Power distribution units

In entertainment industry there are multiple manufacturers and models of power distribution units. In general they commonly have a CEEform plug for input, multiple outputs for schuko or socapex or CEEform out. The units have to have a RCD (Residual-Current Device) switch(’s) and fuses for each outlet to ensure a safe operation for the users and devices.

There is also so called ”cold breakups” commonly from CEEform 16A three-phase to multiple schuko. You have to remeber that there needs to be and RCD and fuses in between the wall outlet and the breakup for safety and also that you can access the fuses easily if a fault or overload occurs.

You must always select the appropriate unit for the specific needs you have in each production. Careful planning is the right answer for the selection.

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

Dimmers

Dimmer is the device used to lower the brighness of a light. By changing the voltage waveform applied to the tungsten lamp, it is possible to lower the intensity of the light. There is different dimmers for controlling tungsten, halogen, fluorescent and led lights. In entertainment industry the common dimmer packs are meant to control conventional tungsten lighting.

As well as power distribution units there is numerous different manufacturers and models of dimmer units available within the industry. Commonly a multichannel dimmer has a CEEform input and a single or multiple Socapex or shuko outputs depending on the size of the dimmer.

Some manufacturers have also combined dimmer and power distribution units. Some with even DMX signal and Ethernet splitting capabilities allowing the user to have only one bigger unit good-to-go rather than taking out multiple separate units for each task.

Calculating wattage and capacity

One of the important skills is to know how to calculate the amount of power needed and how to disribute it evenly between phases. Lack of knowledge may result in electric danger and breaking your equipment.

https://en.wikipedia.org/wiki/Electric_current

One should know the electricity basics and terms so that one understands what one is dealing with better. However you can do the basic calculations by reading the labels and by using the following equations.

How much can an outlet handle?

The equations are fairly simple:

W (wattage) = V (voltage) x A (ampere)

A (ampere) = W (wattage) / V (voltage)

When calculating how much power (Watts) a single 16A shuko outlet can take:

230V x 16A = 3600W

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

When calculating how much power (Watts) eg. a CEEform 16A can take:

230V x 16A x 3(phases) = 11040W

When calculating how many watts a device with an ampere consumption label takes:

For example 2A x 230V = 430W

When calculating how many amperes for example 35000W takes:

35000W / 230V = 152,2A

This divided into 3-phases would mean that you need at least a 63A CEEform to run the 35000W load.

However if you ever feel uncomfortable or unsure about you load calculations, always consult a more experienced technician or electrian. Better to be safe than sorry.

There is one significant label that one needs to chech always from the power cables and their connectors. For example a CEEFform 16A has by standard a label saying 16A-6h this means that the connector is not meant to withstand the full load of more than 6 hours. You need to check the cable too to ensure that it can take the load for the same perioid as the connector. Exceeding the perioid results in cable and connector meltdown and a dangerous electric hazard!

It is a good habit of checking the heat of the power cables when used with maximum loads. If the cable feels warm you are entering the hazardous zone and recalculating of loads is adviced.

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

EXERCISE for lesson 5: Common electrical connectors (EU), power units and wattage calculation

Draw in lines from each phase to the lamps how you would connect the load so that it is as evenly as possible spread out to the three phases.

Solution:

P1: 1200W + 1200W

P2: 1200W + 250W +250W

P3: 1200W+ 250W + 250W

There are other solutions possible as well.

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

CHAPTER 2: AUDIO (BASICS, PART I)

DURATION

Minimum of 6 hours excluding practice. Duration can be adapted according to participant needs and engagement.

INTRODUCTION

The aim of this module is to give the student enough knowledge to be able to engage real life situations in sound reinforcement by introducing the equipment needed, theory and practice needed to operate them.

KEY CONCEPTS / KEY WORDS

Sound reinforcement, audio, microphone, loudspeaker, sound technician, audio connectors.

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

OVERALL OBJECTIVES / COMPETENCES

This module is divided into 5 lessons / learning outcomes:

Basic theory of sound. Is an introduction to the theory of sound, explaining the properties and behaviour of sound waves such as wavelength, amplitude and phase.

Cables and connectors. Provides a description of the most commonly used connectors and cable types in transporting audio signals and the difference between an unbalanced and balanced wiring.

Loudspeakers and amplification. Is a lesson about the properties of loudspeaker types, loudspeaker setups and amplifiers. It covers the functions and properties of a loudspeaker's different elements and essential knowledge needed for the operation of loudspeakers.

Microphone types and applications. Describes the different types of microphones used in sound reinforcement and where to use them to get the best results. Covered in this lesson are the different polar patterns and capsule types, such as dynamic and condencer microphones.

First look at a mixing console and signal chain. Is the first look at a mixing console providing information about the different functions of mixers as well as concepts such as signal chain and mixing positions. In the basic level lesson only basic functions of the console are covered.

OPERATIONAL GOALS

After completion of this module the participants:

- ✓ Will have enough information to start practicing in real life situations.
- ✓ Will have basic knowledge about the basic theory of sound and the tools used in sound reinforcement.
- ✓ Will be ready to advance to the intermediate level

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

LESSONS: AUDIO (BASICS, PART I)

LESSON 1: “The theory of sound”

AIM AND CONTENTS OF THE LESSON

In this lesson, participants are introduced to the theory of sound, explaining the properties and behaviour of sound waves such as wavelength, amplitude, phase and sound pressure. Participants will receive information, both theoretical and practical regarding sound.

Attributes of sound waves such as:

- Amplitude
- Frequency
- Phase
- Wavelength
- Sound pressure

METHODS OF IMPLEMENTATION

Presentation: The first part of the lesson will consist of a presentation explaining the different attributes of the sound waves. During the presentation the facilitator should use audible examples relevant to the attributes being explained. I.e. total cancellation caused by 180° phase difference

Practice examples: During the second part of the lesson participants should try basic calculations like calculating wavelengths of different waves. i.e. 1kHz and 100Hz waves. The facilitator should also play examples of pure tones so the participants can try to identify them and find areas where the sound is cancelled or amplified due to phase differences. (15 – 30 minutes)

Summary and discussion: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

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

EXPECTED OUTPUTS / RESULTS

- Basic level of knowledge on theory of sound
- Ability to perceive how time and distance relate to sound waves and sound pressure

DIDACTIC RECOMMENDATIONS

Presentation: Provide a well-structured presentation with clear and plain English speech, showing visuals and playing audible examples relevant to the presentation.

Summary and discussion: Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.

Breaks: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Speakers
- Mixer with an adjustable oscillator

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 2: “Cables & connectors”

AIM AND CONTENTS OF THE LESSON

In this lesson, participants are introduced to the most common ways of transporting audio signals in modern audio systems. They will receive information about common cable types, connectors and the difference between unbalanced and balanced wiring.

Attributes of cables and connectors such as:

- Impedance
- Multicore vs. single cable
- Digital signal transportation

METHODS OF IMPLEMENTATION

Presentation: The first part of the lesson will consist of a presentation explaining the different ways of transporting audio signal. During the presentation the facilitator should show real examples of the cables and tell examples of where they should be used.

Practice examples: During the second part of the lesson participants should try handling different cables and connecting the connectors. Facilitator should demonstrate the correct way of handling and storing the different cables in a way that promotes clean stage and keeping the cables in good condition. Also trying the difference between an unbalanced and balanced cable at higher lengths (15-30m) would be beneficial in perceiving where their practical limits are. Use an audio signal of your choice to make sure the signal gets transported properly. (30-60 minutes)

Summary and discussion: At the end of the lesson, the facilitator will summarise the main concepts exposed and discuss with the participants in case they have questions (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Ability to handle cables correctly
- Enough knowledge to recognize different cable types
- Understanding the difference between balanced and unbalanced wiring

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

DIDACTIC RECOMMENDATIONS

Presentation: Provide a well-structured presentation with clear and plain English speech, showing visuals of the cables and/or connectors you don't have physically available.

Summary and discussion: Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.

Breaks: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Speakers
- Mixer
- All the cables and connector types available (at least speaker cable, multicore cable, digital cable and microphone cables)

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.
- A real stage would be ideal as an practice environment

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

LESSON 3: “Loudspeakers and amplifiers”

AIM AND CONTENTS OF THE LESSON

In this lesson, participants are introduced to the theory and practice behind amplifiers and loudspeakers. Explaining the properties of different types of loudspekers and the difference between line array and point source systems. In this lessons amplifiers are also introduced to the participants. Participants will receive information, both theoretical and practical regarding loudspeakers and amplifiers.

Attributes of loudspeakers such as:

- Impedance
- Dispersion
- Frequency range
- Sound pressure level
- Amplifiers
- The role of an amplifier in a sound system
- Minimum impedance
- Line array and point source systems

METHODS OF IMPLEMENTATION

Presentation: The first part of the lesson will consist of a presentation explaining the different attributes of the loudspeakers and amplifiers. During the presentation the facilitator should use audible examples relevant to the attributes being explained i.e. dispersion, difference of point source and line array speakers and different types of drivers.

Practice examples: During the second part of the lesson participants should try basic calculations, like calculating impedance of different speakers in order to find if it exceeds the minimum load of an amplifier being used. The facilitator should also play examples of musical content so the participants can identify the differences of point source and line array systems. (15 – 30 minutes)

Summary and discussion: At the end of the lesson, the facilitator will summarise the main concepts exposed, this is also a good time to look back and remind about the concepts introduced during “basic theory” and “cables and connectors” lessons. (20-40 minutes)

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

EXPECTED OUTPUTS / RESULTS

- Understanding about the different parts needed for a sound system
- Deeper knowledge on how distance affects sound waves and sound pressure

DIDACTIC RECOMMENDATIONS

Presentation: Provide a well-structured presentation with clear and plain English speech, showing visuals and playing audible examples relevant to the presentation.

Summary and discussion: Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.

Breaks: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Speakers, one line array system and atleast one point source speaker
- Amplifier (even if using active loudspeakers)
- Mixing console
- Music to be played during practice and presentation

TIPS AND TRICKS

- Set everything, except the sound system up before the lesson starts. Let the participants help with the setup of the sound system.
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 4: “Microphones”

AIM AND CONTENTS OF THE LESSON

In this lesson participants are introduced to the most common microphone types used in sound reinforcement as well their ideal applications. In this lesson the different polar patterns found in microphones are also introduced. Participants will receive information, both theoretical and practical regarding microphones.

Microphone types such as:

- Dynamic microphones
- Condencer microphones
- Ribbon microphones
- Polar patterns
- Cardioid
- Super cardioid
- Figure-of-8
- Omnidirectional

METHODS OF IMPLEMENTATION

Presentation: The first part of the lesson will consist of a presentation explaining the different attributes of the sound waves. During the presentation the facilitator should use audible examples relevant to the attributes being explained different microphone types and directional patterns

Practice examples: During the second part of the lesson participants should try hearing the differences of the microphones and the polar patterns either from recorded examples or live. (15 – 30 minutes)

Summary and discussion: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Basic level of knowledge on the common microphone types
- Ability to perceive the differences between microphone types and polar patterns.

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

DIDACTIC RECOMMENDATIONS

Presentation: Provide a well-structured presentation with clear and plain English speech, showing visuals and playing audible examples relevant to the presentation.

Summary and discussion: Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.

Breaks: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Speakers
- Mixing console
- Different microphone types with different polar patterns and/or recordings of such.

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 5: “Mixing consoles”

AIM AND CONTENTS OF THE LESSON

In this lesson, participants take the first look at a mixing console, introducing the most basic function and the concept of signal chain. Participants will receive information, both theoretical and practical regarding mixing consoles.

Features of mixing consoles such as:

- Adjustable input gain
- Equalizer
- Filters
- Attenuation and boosting
- Signal chain

METHODS OF IMPLEMENTATION

Presentation: The first part of the lesson will consist of a presentation explaining the different features of the mixing console. During the presentation the facilitator should use audible examples relevant to the attributes being explained. I.e. how an equalizer shapes the tone of the sound

Practice examples: During the second part of the lesson participants should connect a basic sound system. Include atleast one mixer, loudspeaker and a couple of microphones. Try to include same types of cables as in earlier lessons. After completing the sound system participants should try adjusting the gain of the microphones and the EQ in order to get rid of feedback or to make the tone more pleasing. (15 – 30 minutes)

Summary and discussion: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Ability to connect a simple sound system
- Ability to adjust the input gain of a signal to a desired level
- Ability to shape an audio signal by using an EQ

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

DIDACTIC RECOMMENDATIONS

Presentation: Provide a well-structured presentation with clear and plain English speech, showing visuals and playing audible examples relevant to the presentation.

Summary and discussion: Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.

Breaks: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Speakers
- (Digital) mixer with adjustable gain, HPF and fully adjustable EQ
- All the cables and connector types needed for the sound system
- Microphones

TIPS AND TRICKS

- Set up only the equipment needed for the presentation. Rest should be setup by the participants during the practice (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

CHAPTER 3: VIDEO (BASICS, PART I)

DURATION

6-20 hours – but it´s almost impossible to tell how much time is needed. It depends on what kind of lighting equipment is available, if any. We also recommend you to make a study visit. Regardless, it´s not a good idea to hurry as there will be a lot to learn and remember to be able to use it in real-life situations.

INTRODUCTION

This module provides the backgrounds of video technology. It includes the basics of video signals and formats, most used interfaces and connectors, essentials of videocameras, displays and projectors and other related technological topics such as video editing tools, video mixers and conference platforms.

KEY CONCEPTS / KEY WORDS

Video signals, video formats, video compression, video coding, cameras, video editing, video mixers, displays, projectors, conference platforms

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

OVERALL OBJECTIVES / COMPETENCES

This module is divided into 6 lessons / learning outcomes:

1. **Video signal types and standards**. The lesson introduces the definition of signal and describes the basic characteristics of the video signals and streams.
2. **Video formats. Interfaces and cables for video**. It provides a description of the fundamentals of video formats as well as the interfaces and cables used to carry video signals.
3. **Digital cameras.** This lesson addresses for the first time the camera technologies as well as their basic features.
4. **Video editing and video mixers.** Introduces student to video editing and the basics of the video editors. Moreover, the video mixers are presented in their fundamental aspects.
5. **Displays and projectors.** This lesson introduces the student to the fundamentals and characteristics of displays and projectors. It also compares the specific technologies used in these devices.
6. **Digital conference platforms.** The last section exposes the fundamentals of conference platforms.

OPERATIONAL GOALS

After completion of this module the participants:

- ✓ Will have enough information to start practicing in real life situations.
- ✓ Will have basic knowledge about the basic theory of video and the elements used in video capture, editing and broadcasting.
- ✓ Will be ready to advance to the intermediate level.

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

LESSONS: VIDEO (BASICS, PART I)

LESSON 1: “Video signal types and standards”

AIM AND CONTENTS OF THE LESSON

In this lesson, participants are introduced to the concept of video signal. Then, the main types of video signals are described:

- Analogue video signals
- Digital video signals

Later, the main characteristics of video streams are detailed:

- Frame
- Frame size
- Frame rate
- Aspect ratio
- Colour space

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the different attributes of the video signals. During the presentation the facilitator should show different video and image examples to illustrate the theoretical concepts.
- **Exercices**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

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

EXPECTED OUTPUTS / RESULTS

- Basic level of knowledge on video signals
- Ability to identify the basic characteristics of video signals.

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 2: “Video formats. Interfaces and cables for video.”

AIM AND CONTENTS OF THE LESSON

In this lesson, video file formats are presented to the participants. Specifically, video compression and encoding are explained at the elemental level. For this, several picture and video examples are provided to show the difference between different compression rates at specific codecs (video compression formats).

Furthermore, the commonly used amateur video connection interfaces are listed and described (composite video, VGA, DVI, HDMI, Thunderbolt).

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the different attributes of the video formats. During the presentation the facilitator should show different video and image examples to illustrate the effect of using different compression rates or video formats. With regard the video interfaces, it should be advisable to show real connectors to the participants.
- **Exercices**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Basic level of knowledge on video formats and video interfaces and connectors.
- Ability to identify the basic characteristics of video formats, interfaces and cables.

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.

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

- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Examples of real connectors and cables (composite video, VGA, DVI, HDMI, Thunderbolt).

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 3: “Digital cameras”

AIM AND CONTENTS OF THE LESSON

In this lesson, the backgrounds on cameras are shown. Then, the different types of amateur or semi-professional video storage are detailed (SD card, CF card, SSD, etc.). Besides, the parts of video cameras are listed and a short classificacion of video cámaras is provided.

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the different attributes of the video cameras. During the presentation, the facilitator should show different examples of cameras to illustrate the characteristics and differences between different types of video cameras.
- **Exercices**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Basic level of knowledge on video cameras and theirs features.
- Ability to identify the basic characteristics of video signals.

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

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

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Examples of real cameras (professional, camcorders, DSLR, webcams and camera phones) and examples of images recorded by means of these cameras.

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 4: “Video editing and video mixers.”

AIM AND CONTENTS OF THE LESSON

In this lesson, two related concepts are explained. On one hand, the fundamentals of video editing is described. This includes the definition of video editing, the esential parts of a video editor, the stardards frames, panels and windows of the most video editing software.

On the other hand, video mixers are presented to the participats. These devices are used to select and compose video signals from different sources in real time. To this end, some mixing devices as well as their features and functionalities are shown.

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the video editing concept. During the presentation the facilitator should show different Graphical User Interface (GUI) of the most common editing software, detailing the functionality of each element of the interface. The second part of the lesson will include the video mixers. Thus, the facilitator will show examples of different devices with images (or real devices is they are available).
- **Exercices**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Basic level of knowledge on video editing and video mixers.
- Ability to identify the different elements in the GUIs of video editing software.
- Ability to identify the basic inputs and outputs as well and keys of a video mixer.

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

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Examples of video editing software. It is advisable to show real examples of software. If the facilitator does not have them, screenshots or videos tutorials can be used.
- Examples of video mixers. It is advisable to show real devices. If the facilitator does not have them, pictures of them can be used.

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 5: “Displays and projectors”

AIM AND CONTENTS OF THE LESSON

In this lesson, the devices used to render video signals are introduced. On one hand, the basic technologies of displays (both analogue and digital ones) are detailed. This includes CRT screens, plasma, LCD and LED displays. Moreover, these technologies are compared providing an easy abstract of the display systems. On the other hand, the characteristics and different technologies of projectors are delineated in the lesson, including the CRT, LCD and DLP.

For both devices, displays and projectors, the main features are portrayed: resolution, optics, luminosity, aspect ratio, screen refresh, etc.

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining displays and projects, and their main features. During the presentation the facilitator should show different pictures and schemes of the devices. It should also advisable to show devices of different technologies rendering the same video signal so that the student appreciates the differences between the specific technologies.
- **Exercises**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear. It can also be suggested as optional exercise, a brief research about the last projection technologies available in the market.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Basic level of knowledge on displays and projectors.
- Ability to identify the advantages and disadvantages of each display technology.
- Ability to identify the advantages and disadvantages of each projector technology.

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

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Examples of different real displays and projectors.
- Video distributor to provide the same video signal (analogue and digital ones) to several displays and projectors simultaneously.

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 6: “Digital conference platform”

AIM AND CONTENTS OF THE LESSON

In this lesson, a short introduction about the digital conference platforms is provided to participants. The main features and benefits of conference platforms are also detailed.

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the the digital conference platforms and their main features.
- **Exercises**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear. It can also be suggested as optional exercise, a brief research about conference rooms used nowadays.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Basic level of knowledge on digital conference rooms.
- Ability to identify the benefits of the use of the conference rooms.

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

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

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

BASIC LONG COURSE, PART II

CHAPTER 1: LIGHTING (BASICS, PART II)

DURATION

More than 10 hours, though it's impossible to say exactly how much time is needed. Some of the excercises are practical, so it's a good idea to spend plenty of time on them as you learn a lot about what lighting design is during that lesson. The same goes for the lighting console software.

INTRODUCTION

The purpose of this chapter is to get to know the light fixtures and tools we learned about in the basics, and to get a deeper insight into what lighting design is about. Most of this chapter focuses on how to practice lighting design and goes through the basics of practical scene creation. Using the trial and error method, the participant will learn about the advantages and disadvantes of different types of lamps and how to position them. The chapter starts by going through the tools you use to hang fixtures and presents element such as stands, trusses and hoists. Towards the end, the participant will learn how to create a workflow with lighting consoles.

KEY CONCEPTS / KEY WORDS

rigging, clamp, hook, safety cables, truss, stand, hoist, scene creation, three-point-lighting, plot, key light, fill light, back light, background light, patch, palettes, scene, cue, cue stack, chase

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

OVERALL OBJECTIVES / COMPETENCES

This module is divided into 4 chapters:

Lesson 1: Three-point and four-point lighting basics

How to practice lighting design, and the basics of practical scene creation. The lesson introduces three-point lighting, which forms the basis of all lighting in TV, film, theatre and live performances. It is the principle of how to light objects, scenes or people well, and how the human eye perceives it.

Lesson 2: Three-point lighting adapted to show lighting

This lesson shows samples of different lights and angles on a medium sized stage. The four-point lighting venue is broken down into images.

Lesson 3: Looking at lighting consoles, creating a workflow with moving lights

This lesson teaches the key points to know when using most lighting consoles to control moving lights. In the samples we're using Chamsys Ltd MagicQ consoles, a lighting control system with free software available for download. However, the lesson will not limit itself to any specific console system, but will rather focus on the workflow.

OPERATIONAL GOALS

After completion of this module the participants:

- Will have gained both theoretical knowledge and practical experience regarding three-point lighting and how it can be adapted to show lighting
- Got deeper knowledge about fixtures and lighting design
- Will have been made aware of some important aspects to be considered when dealing with rigging and rigging tools
- Will have acquired insight into the workflow they are most likely to encounter when using a lighting console.

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

LESSONS: LIGHTING (BASICS, PART II)

LESSON 1: ”Three-point and four-point lighting basics” and ”Three-point lighting adapted to show lighting”

Three-point lighting is the basis of all lighting in TV, film, theatre and live performances. It is the principle of to light an object, scene or person well, and how the human eye perceives it.

AIM AND CONTENTS OF THE LESSONS

The purpose is to teach the principle of how an object, scene or person is well lit. The goal is to make the participant learn, by trial and error, the advantages and disadvantes of different types of lamps and how to position them.

METHODS OF IMPLEMENTATION

There is a presentation with both text and pixtures, as well as some practical excercises for deeper understanding.

Exercise 1

It will be good to repeat this exercise several times over as the participant learns to handle different fixtures and develops a trained eye for lighting. It’s also a good idea to change the position and angle of the fixtures to better make the participant aware of the differences.

Notice: “There is no 'perfect way' to do it, but it gives you an idea where you can start searching for the right solution. Learning to see the hows and whys a solution works or not is a skill that only develops over time and with practical experience.”

Exercise 2

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

It’s a good idea to not use colours on all of the fixtures at the same time, and not use too many different colours either: if you mix in too many colours, it'll be more difficult to see the effect each colour has.

Exercise 3: Drag and drop. Three-point lighting adapted to show lighting

This is quite the extensive exercise. Before the participants do this excercise they need to make sure what kind of equipment are on the different lists: ”Check the manufacturers' webpages and brochures if necessary.” A suggestion is that the participant makes a list and explains what kind of equipment will be used.

EXPECTED OUTPUTS / RESULTS

- Deeper knowledge of different fixtures in entertainment lighting.
- Deeper insight into how fixtures differ and provide different kinds of light.
- Reflections on what lighting design is about and how the lighting image changes due to the colors used as well as the different positions and angles of the fixtures.

DIDACTIC RECOMMENDATIONS

Presentation: Try to provide an enthusiastic yet well-structured presentation. If possible, show real examples of the equipment.

Summary and discussion: Try to be as precise as possible, highlighting the most important aspects the participants must take into consideration. Foster interaction between participants, and between the participants and you. Ask questions to check if they understand the concepts exposed. Act as a moderator in case a discussion between participants occur.

Breaks: It's important to take a break of around 5-10 minutes before summarising the aspects addressed in this lesson.

PREPARATIONS AND EQUIPMENT

- Computer
- Internet connection

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

Lighting equipment:

- Light fixtures as PARcans, fresnels and profiles.
- Stands
- Power cables
- Dimmer (if available)
- Color gel

LESSON 2: ”Looking at lighting consoles, creating a workflow when using moving lights”

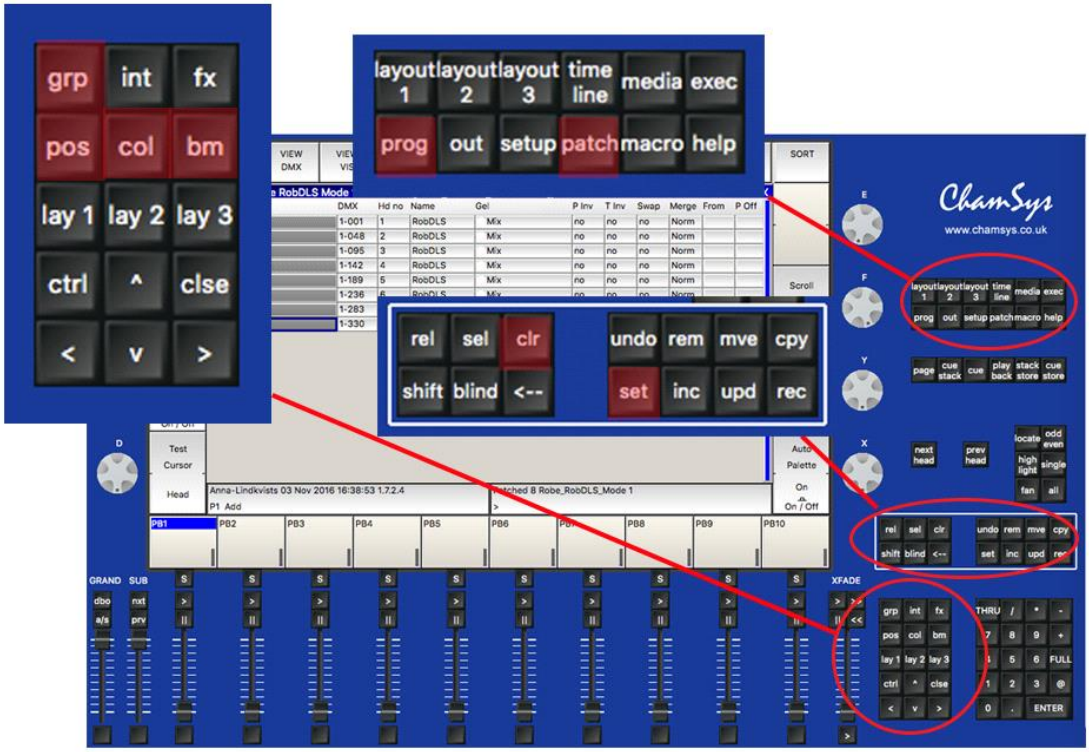
This lesson teaches the key points that apply to most lighting consoles used with moving lights. Focus will be on the workflow you may encounter with any console. Example steps in the workflow may be patching/updating the software, and the fixture library.

AIM AND CONTENTS OF THE LESSON

The aim of this lesson is to go through a number of functions of the lighting consoles. We use ChamSys Magic Q Software as an example.

During the lessons we go through the functions that connected to the buttons marked with red. These useful functions are described in the course materials using the layout of the ChamSys Magic Q Software. These functions are also available on the other consoles but the names may vary from one to the other.

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



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

CHAPTER 2: AUDIO (BASICS, PART II)

DURATION

Minimum of 6 hours excluding practice. Duration can be adapted according to participant needs and engagement.

INTRODUCTION

The aim of this module is to give the student deeper knowledge about sound reinforcement and introduce new equipment and techniques that are present in real life situations.

KEY CONCEPTS / KEY WORDS

Sound reinforcement, audio, microphone, wireless microphone, sound technician, transmitter, receiver, mixing console

OVERALL OBJECTIVES / COMPETENCES

This module is divided into 4 lessons / learning outcomes:

- **Wireless technology**. Is an introduction to wireless technology, explaining how the audio signal is transferred between transmitters and receivers via radio waves. In the lesson different kinds of microphones, transmitters and antennae are also introduced.
- **Mixing consoles, continued**. Continues the lesson of the basic course in to the features of a mixing console. In the lesson more advanced features, such as dynamics processing and signal routing is introduced.
- **Goals for mixing.** Is a lesson about the general goals for mixing at front of house and monitors. The differences between the general goals and things to take in to account are explained in the lesson.

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

- **Microphone placement**. Describes the general rules for microphone placement and how to achieve desired sound consistently by understanding basic microphone characteristics, sound-radiation properties of musical instruments, and acoustic fundamentals.

OPERATIONAL GOALS

After completion of this module the participants:

- ✓ Will have enough information to start practicing in real life situations.
- ✓ Will have deeper knowledge about the theory of sound and broader knowledge about the different tools used in sound reinforcement
- ✓ Will be ready to move to the advanced level

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

LESSONS: AUDIO (BASICS, PART II)

LESSON 1: “Wireless technology”

AIM AND CONTENTS OF THE LESSON

In this lesson, participants are introduced to wireless technology, explaining how the audio signal is transferred between transmitters and receivers via radio waves. In the lesson different kinds of microphones, transmitters and antennae are also introduced..

- Transmitters such as:
    - Handheld
    - Beltpack
    - Plug-on
- Microphones such as:
    - Handheld
    - Headset
    - Clip-on

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

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the wireless chain of transmission and the general rules for a functioning transmission. Effects of antenna placement i.e. line of sight between the transmitting and receiver and different attributes of the microphones should be explained before practice.
- **Practice examples**: During the second part of the lesson participants should try wearing different types of microphones and see for themselves how the placement affects the sound. It is also important to practice how to place a microphone on another person, since it's required in most working environments. The facilitator should cause losses to the transmission chain and let the student work out the problems with or without the help of the troubleshooting chart. (60 – 120 minutes)
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Understanding of the wireless transmission chain
- Ability to solve problems in the transmission chain
- Ability to wear and place a microphone on a person

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals and playing audible examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

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

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Speakers
- Mixing console
- Wireless microphones, transmitters, receivers and antennae

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 2: “Mixing consoles, continued”

AIM AND CONTENTS OF THE LESSON

This lesson continues the lesson of the basic course in to the features of a mixing console. In the lesson more advanced features, such as dynamics processing and signal routing is introduced. Features such as:

- Dynamics processing
- Signal routing

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the different features of a mixing console. During the presentation the facilitator should play examples from a recording (or live) and demonstrate the intended means for the relevant features
- **Practice examples**: During the second part of the lesson participants should try using the console themselves. Using a microphone or a recording as a sound source and try all the features introduced in the presentation. (min. 60 minutes)
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed and discuss with the participants in case they have questions (15-30 minutes)

EXPECTED OUTPUTS / RESULTS

- Ability to use at least the mixing console used in the demonstration
- Enough knowledge to use a mixing console without supervision and take advantage of the different features

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

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals of the features presented.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes or 30 minutes every 90 minutes

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Speakers
- Mixing console
- Recordings of different instruments/music and/or
- Microphones and instruments

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.
- A real stage with a real PA or a studio would be an ideal practice environment

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

LESSON 3: “Goals for mixing”

AIM AND CONTENTS OF THE LESSON

During this lesson the participants are introduced to the general goals for mixing at front of house and monitors. The differences between the general goals, work flow and other things to take in to account are explained in the lesson.

- Differences such as:
    - Mixing at a corporate event vs. musical event
    - Mixing at front of house vs. mixing monitors

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a conversation-based presentation about the goals for the different mixing positions. Discussing about things that the participants think are important in a mix.
- **Practice examples**: During the second part of the lesson participants should try making a balanced mix at front of house and at monitor position using recordings or live sound sources. Each participants should play the role of the performer as well as a sound technician (45 – 90 minutes)
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed and answer any questions that have risen during the practice (20-40 minutes)

EXPECTED OUTPUTS / RESULTS

- Understanding the differences between mixing front of house and monitors
- Increased communication skills that benefit monitor mixing

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

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech. Make sure to provoke conversation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Flipchart or whiteboard
- Paper and pens
- One sound system for front of house purposes and one separate monitor system
- Mixing console (separate consoles for monitor and front of house are preferred)
- Recordings and/ or live sound sources for the practice

TIPS AND TRICKS

- Set everything, except the sound system up before the lesson starts. Let the participants help with the setup of the sound system.
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 4: “Microphone placement”

AIM AND CONTENTS OF THE LESSON

The aim of this lesson is to describe the general rules for microphone placement and how to achieve desired sound consistently by understanding basic microphone characteristics, sound-radiation properties of musical instruments, and acoustic fundamentals.

- Rules and effects such as:
    - 3-to-1 rule
    - Potential acoustic gain
    - Proximity effect

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation showing how to determine where to put a microphone in order to get optimal sound. Demonstrating the procedure while talking. During the presentation proximity effect and 3-to-1 rule should be introduced as well.
- **Practice examples**: During the second part of the lesson participants should try placing microphones on different instruments at different distances in order to perceive the effect distance and placement has on the sound. (45 – 90 minutes)
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed discuss with the participants about the practice. (20-40 minutes)

EXPECTED OUTPUTS / RESULTS

- Understanding how the placement of a microphone affects the sound
- Understanding basic microphone characteristics, sound-radiation properties of musical instruments, and acoustic fundamentals

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

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech. Make sure to provoke conversation and demonstrate how the placement affects the sound
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Flipchart or whiteboard
- Speakers
- Mixing console
- Microphones with different polar patterns and capsule types
- Live sound sources for the practice

TIPS AND TRICKS

- Set everything, except the sound system up before the lesson starts. Let the participants help with the setup of the sound system.
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

CHAPTER 3: VIDEO (BASICS, PART II)

DURATION

Minimum of 12 hours excluding practice. Duration can be adapted according to participant needs and engagement.

INTRODUCTION

This module continues the backgrounds described in the basic level of the video technology course. It includes the most common parameters of video signals, the basics of video compression, a new set of video connectors and interfaces, a deeper knowledge about digital cameras and video editing and mixers, intermediate features of displays and video projectors, and finally some commercial solutions for conference platforms.

KEY CONCEPTS / KEY WORDS

Video signals, video formats, video compression, video coding, cameras, video editing, video mixers, displays, projectors, conference platforms

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

OVERALL OBJECTIVES / COMPETENCES

This module is divided into 6 lessons / learning outcomes:

1. **Video signal types, standards and formats**. Analogue and digital video streams are presented, as well as their main parameters and most common standards. Afterwards the lesson deals with video file formats regarding two main features: compression and coding techniques.

2. **Interfaces and cables for video**. Where both old analogue and new digital interfaces for video are revised in depth.

3. **Digital cameras.** After introducing the basic operation of a camera, the interest of the chapter is to present the optic system and the electronic parts in a camera.

4. **Video editing and video mixers.** This point focuses on video editing by means of two extended solutions such as Movie Maker and iMovie. To conclude, it introduces to the way a video mixer works and its structure.

5. **Displays and projectors.** This lesson goes in depth with LCD display technologies. Regarding projectors, it presents advanced technologies like pico or 3D projectors.

6. **Digital conference platforms.** After having being presented the main concepts regarding conference platforms the interest is now placed specifically on videoconference platforms and also on solutions for conference recording and producing.

OPERATIONAL GOALS

After completion of this module the participants:

- ✓ Will have enough information to work with real solutions for video producing, displaying, recoding and broadcasting.
- ✓ Will have intermediate knowledge about the video interfaces and formats, as well as solutions for video capture, editing and broadcasting. Also the
- ✓ Will be ready to continue learning in the advance level.

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

LESSONS: VIDEO (BASICS, PART II)

LESSON 1: “Video signal types, standards and formats”

AIM AND CONTENTS OF THE LESSON

In this lesson, firstly, participants are introduced to the video signal types and standards. The main types of video streams are described:

- Analogue video streams: components (luma, chroma and synchronization) and standards (PAL, SECAM and NTSC).
- Digital video streams: parameters (pixel, frame rate, frame size, resolution, colour depth and video size) and most common standars (SDTV, EDTV, HDTV and UHDTV).

Later, the video file formats are examined. Regarding video compression, it focuses on lossy compression solutions and video quality behaviour. The lesson ends presenting the relationship between video content, coding formats (MPEG-4, H.264, H.265, Real Video, VP9) and containers (AVI, Matroska, MP4, MXF, Ogg, Quicktime).

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a multimedia presentation explaining the different attributes of the video signals. During the presentation the facilitator should show different video and image examples to illustrate the theoretical concepts.
- **Exercises**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

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

EXPECTED OUTPUTS / RESULTS

- Intermediate level of knowledge on video signals and formats.
- Ability to deal with video signals and systems at a medium level.

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 2: “Interfaces and cables for video.”

AIM AND CONTENTS OF THE LESSON

In this lesson, most commonly interfaces for both analogue and digital video are listed and described (analogue: SCART, S-video, YP_BP_R, Coaxial cable (RF) – digital: SDI, DisplayPort, MHL).

METHODS OF IMPLEMENTATION

- **Presentation**: The lesson will consist of a presentation explaining the different attributes of the analogue and digital video interfaces. It should be advisable to show real hardware (i.e. connectors) to the participants.
- **Exercises**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Intermediate level of knowledge on video interfaces and connectors.
- Ability to identify the basic main interfaces and cables, as well as their applications.

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

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

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Examples of real connectors and cables (composite video, VGA, DVI, HDMI, Thunderbolt, SCART, S-video, YP_BP_R, Coaxial cable (RF), SDI, DisplayPort and MHL).

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 3: “Digital cameras”

AIM AND CONTENTS OF THE LESSON

In this lesson, there are three main objectives regarding digital cameras. The first one consist in explaining how a camera works. The following two are focused on describing properly the lens system and the electronic components (sensor –CCD, CMOS-, viewfinder and tactile) respectively.

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the different attributes of the video cameras. During the presentation, the facilitator should show different examples of cameras and optic systems to illustrate the characteristics and differences between different technologies.
- **Exercises**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Intermediate level of knowledge on video cameras and their features.
- Ability to operate, adjust the optical system and identify the electronic components of a digital camera.

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

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

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Examples of real digital cameras (professional, camcorders, DSLR, webcams and camera phones) and examples of images recorded by means of these cameras.

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 4: “Video editing and video mixers.”

AIM AND CONTENTS OF THE LESSON

In this lesson, the student will do some practice with video editing (add, edit, split, speed up/slow down videos) and mixing. For the video editing there will be used two different solutions: Movie Maker and iMovie. Regarding video mixing, it will be revised the way it works and the main applications (wipe and DVE transitions, Keyer, etc.).

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of an interactive practical lesson working if possible with the Movie Maker and iMovie software. The second part of the lesson will include the video mixers. Thus, the facilitator will show examples of different devices with images (or real devices working if they are available).
- **Exercises**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Intermediate level of knowledge on video editing and video mixers.
- Ability to use any video editing software (Movie Maker, iMovie or both).
- Ability to identify the parts and basic controls of a video mixer.

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

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- It should be advisable to use Video sources and Movie Maker or iMovie software. If the facilitator does not have them, screenshots or videos tutorials can be used.
- Examples of video mixers. It is advisable to show real devices and applications. If the facilitator does not have them, pictures of them can be used.

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 5: “Displays and projectors”

AIM AND CONTENTS OF THE LESSON

In this lesson, LCD display technologies are revised in depth (TN-Twisted Nematic, IPS-In Plane Switching and VA-Vertically Alligned). With respect to projectors, the focus is placed on advanced technologies (pico, 3D, LCoS, LBS, HLP projectors) as well as projection screen features.

For both kind of devices, displays and projectors, again the main features are portrayed: resolution, optics, luminosity, aspect ratio, screen refresh, etc.

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining displays and projectors, and their main features. During the presentation the facilitator should show different pictures and schemes of the devices. It should also advisable to show devices of different technologies rendering the same video signal so that the student appreciates the differences between the specific technologies. In case of availability it is also possible to do some practice connecting multimedia players or sources through different interfaces to different types of projectors and take a look at projection features.
- **Exercises**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear. It can also be suggested as optional exercise, a brief research about the last projection technologies available in the market.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Intermediate level of knowledge on displays and projectors.
- Ability to identify the advantages and disadvantages of LCD display technology.
- Ability to identify the application and requirements of each projection technology.

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

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Examples of different real displays and projectors.
- Video distributor to provide the same video signal (analogue and digital ones) to several displays and projectors simultaneously.

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 6: “Digital conference platforms”

AIM AND CONTENTS OF THE LESSON

In this lesson, after introducing the concept of videoconference, some of the most extended videoconference solutions (Skype, Skype for Business, Hangouts, Hangouts On Air, Spontania) and conference recording/production solutions (VCREC, Movenote) are presented.

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the the digital conference platforms and their main features.
- **Exercises**: After the theoretical lesson, students should do some practice with all or some of the free software solutions mentioned before. The teacher should guide the process of installation, configuration and using them with a specific purpose and between the students.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

EXPECTED OUTPUTS / RESULTS

- Intermediate level of knowledge on digital conference platforms.
- Ability to identify the main types and applications of videoconference systems and conference recording/producing systems.
- Ability to use some of the free available solutions in order to start a videoconference lesson, as well as to record or produce a real conference.

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

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Computer or mobile devices where to install any videoconference and/or conference recording/producing solution, as well as Internet connection.

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

ADVANCED SHORT COURSE

CHAPTER 1: LIGHTING (ADVANCED)

DURATION

About 10 hours. Be flexible and adapt according to the participant's needs and engagement. The last exercise is, if possible, to build the set as well as patch and program a console. In that case, 10 hours may not be enough.

INTRODUCTION

This chapter introduces the workflow of a full lighting setup. The excercise is an imaginary situation where the boss of the company has given the participant the lighting plot from a customer's order to work on. The participant will require the lighting console programming knowledge from the previous course as well as the basics of dmx connections from the first course.

The chapter will train the participant to work independently and to figure out what solutions work best when he or she's given a lighting plot from a customer order to work on.

Throughout this exercise the participant will have access to guidance regarding what to think about and how to look at- and consider things from different angles.

KEY CONCEPTS / KEY WORDS

lighting setup, trussing, rigging, power, signal, plot, fixture schedule, patch sheet, dmx splitter, dmx universe

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

OVERALL OBJECTIVES / COMPETENCES

This module is divided into 3 main chapters:

- Planning the lighting rig from a plot

  The participant needs to make lists of what's needed, and to compare the lighting plot with the company's equipment.

- Planning the power connections and wattage

  What you need to think about when calculating the total wattage of the system

- Planning the DMX signal routing

  How many dmx channels will the company's moving heads use? What's the length? The participant will be shown how to get the information needed.

OPERATIONAL GOALS

The purpose is to make the participant ready to design, plan and calculate his or her own lighting rig, and to make the participant feel confident about handling the equipment.

After completion of this module the participant

- Has trained how to deal with a lighting plot, a fixture list and a patching list
- Has trained the planning lighting rig from a plot
- Has acquired deeper knowledge of important aspects to be considered when dealing with rigging and rigging tools
- Knows what aspects to consider when calculating the total wattage of the system
- Has gained a deeper knowledge about dmx routing
- Has gained a deeper knowledge about the fixtures and lighting design.

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

LESSONS: LIGHTING (ADVANCED)

SOLUTION TO LESSON 1: “Planning the lighting rig from a plot “

This is an maginary situation where the boss of the company has given the participant a customer's lighting plot to work on.

The participant has to figure out what the costumer is asking for and compare that to the equipment the company already has. There are a lot different manufacturers on the market, so there's a considerable risk that you won't have exactly what the customer is asking for. However, similar fixtures from another manufacturer may work as well as long as the output and specification match, at least closely.

The participant will need to select the suitable tools from the company selection and make sure everything is working and has been programmed correctly for the actual delivery.

AIM AND CONTENTS OF THE LESSON

The participant will be trained in how to plan the lighting rig from a plot. One of the main things with this lesson is to learn to read the instructions well. The company has given a lighting plot from a customer order to work on. The participant must start the planning by looking at the fixture schedule -- the desired fixture order -- and compare the fixtures in the order with the fixtures the company already has, and see if there's anything similar in storage.

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

METHODS OF IMPLEMENTATION

There is a presentation with both text and pictures (the lighting plot, fixture list and and a patch list). Everything of notice is described in the chapter, for example:

- It is good to start working from the desired fixture order (check the fixture schedule)
- The trussing and rigging in the plot: Check the truss type, and check the manufacturer's specifications of it to ensure that the span the customer ordered will actually withold the hanging weight of the desired fixtures.
- You should print out the plots as needed, and take a closer look and calculate the required cable lenghts and rigging heights. The grid on the plot background is 1m x 1m.

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

SOLUTION TO EXERCISE 1: Planning the lighting rig from a plot

The participant should make a list of the heads whose light will best match the required specifications in the plot order. The list should include:

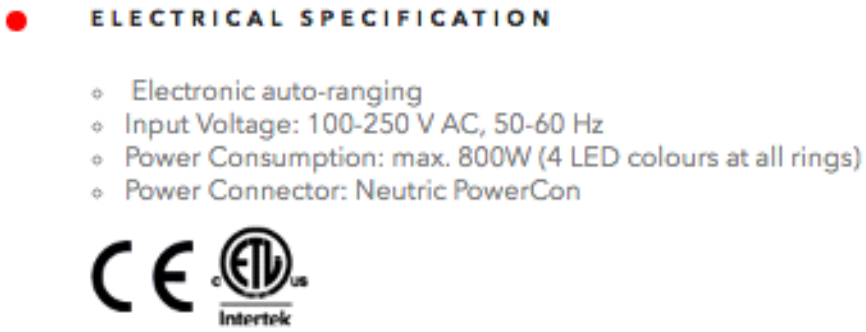
- The make and model of the fixture
- The opening angle of the fixture
- The wattage power a single fixture consumes

The model and angle

- ETC Source Four Zoom 25-50 ° **Conventional lights - a profile**
- Robe Robin 1000 LED Beam 7-63 ° - **Moving lights**

The wattage that a single fixture consumes

- ETC source Four: 750 w (you find the information at the fixture list)
- Robe Robin 1000 LED Beam: "With the ordered heads the wattage would be 800W per fixture" -- but the participant won't get that information from the fixture list! *Instead, the participant has to find that information in the user manual (which you can find on the Internet).*



Also worth noticing is the light output (18 000 lx measured from 5 m). Compare that to the selected moving head from the company.

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

EXPECTED OUTPUTS / RESULTS

- Knowledge of how to deal with a lighting plot, a fixture list and a patching list
- Knowledge of how to find information about the make and model of a fixture
- Knowledge of how to find information about the power in wattage a single fixture consumes

PREPARATIONS AND EQUIPMENT

- Computer
- Internet connection
- Printer

If the participant is actually working at a company he/she has to figure out what equipment can be used. The participant will need to select the suitable tools from the company selection and make sure everything is working and has been correctly programmed for the actual delivery.

If the participant isn’t currently working at a company, it's possible to use the ordered information for the exercises; no more equipment is needed.

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

SOLUTION TO LESSON 2: “Planning the power connections and wattage“ and “Planning the DMX signal routing“

When the packing lists of the needed hardware and fixtures is done, the participant can start working on the details of the delivery such as the power and signal matters. First we'll go through the power distribution.

AIM AND CONTENTS OF THE LESSON

The participant will be trained to plan the power connections and wattage, and be trained to plan the dmx signal routing. The information needed has already been presented on the fixture- and patch list.

METHODS OF IMPLEMENTATION

Excercise in lesson 2: Planning the power connections and wattage.

1. On the printed plot, draw the power circuitry and cable types you're about to use to power the system.

2. Make a list of all the dimmers, power distribution parts and power cables you will need to complete the setup, including different cable lenghts. Add this list to the packing list in the exercise in lesson 1.

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

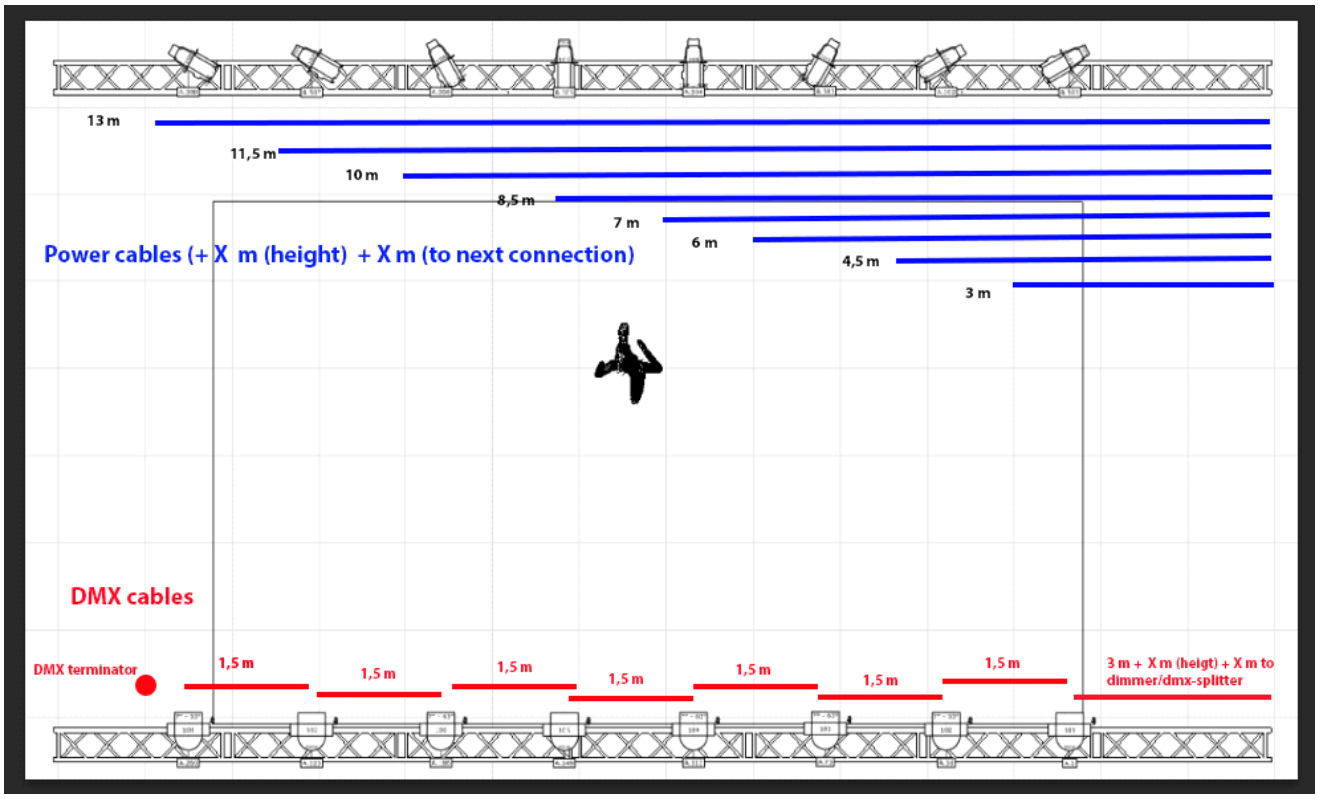
During the lesson the participant will receive this necessary information:

- You have one outlet of CEEFORM 32A three-phase 20m from the upstage left corner.
- The total wattage of the system: calculate by checking the consumption from the fixture manuals. In the ordered system the total wattage is 12,4kW.
- CEEFORM 16A three-phase is not enough for the full system, but wiith a CEEFORM 32A we can easily distribute full power safely to all the lamps.
- We'll need an 8-channel dimmer with no less than 750W capacity per channel. Commonly, the dimmer packs are built in 6 channel packages. This means the next suitable and commonly available model would be a 12 channel dimmer pack. The heads 101 to 103 would be connected to the first phase, the heads 104-106 to second phase, and the last remaining heads 107 and 108 to the 3rd phase on the CEE16A.
- Phases one and two are more loaded than the 3rd phase, which means it'd be good to connect gear such as lighting consoles and DMX splitters on this phase.

You should always try to use full-length cables rather than connect several shorter cables together. For example, a 20 m power cable is much better than connecting two 10 m power cables together to reach the same length. The same goes for DMX cables.

Also, it's always better with a "too long" cable than connecting shorter cables to reach the needed length. With power cables you have a lot of length options, for example 3 m, 5 m, 10 m, 15 m, 20 m, and so on. If you need a 12 meter cable, use a 15 m cable rather than connecting a 10 m and a 3 m cable together.

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



In the plot above you see that both the dmx cables and power cables have some extra length to them. For example, there's only a 1 meter distance between the moving heads, but the suggested dmx cable is 1,5 m long.That's because it's always good to have a little extra cable in case you need to move the fixtures a bit. You never want the cables to be stretched tight.

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

SOLUTION TO EXERCISE IN LESSON 2: “Planning the DMX signal routing“

There are many different solutions. Everything depends on where on stage the participant chooses to put the dimmer and the dmx-splitter. Here's the information that's presented in lesson 3:

- First you need to check what type of connectors the ordered or planned moving light fixtures have. Most of the latest models have both 5- and 3-pin XLR connectors.
- How many universes do you need to run from the console? In the plot you have everything in one universe, meaning a single run from the front of the house should do… unless you want a second line in case something goes wrong?
- There's a suggestion of a second dmx line if something goes wrong. In that case: at the stage end you'll need to have the signal split into dimmer and the moving lights on the truss - a DMX splitter with at least 2 outputs.
- Remember to add a DMX terminator on the output of the last fixture.

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

CHAPTER 2: AUDIO (ADVANCED)

DURATION

Minimum of 8 hours excluding practice. Duration can be adapted according to participant needs and engagement.

INTRODUCTION

The aim of this module is to give the student enough information about acoustic simulation and measurement software so they can use software tools to design a sound system and optimize it to the room.

KEY CONCEPTS / KEY WORDS

Sound reinforcement, audio, measurement microphone, phase response, acoustic simulation, analyzer

OVERALL OBJECTIVES / COMPETENCES

This module is divided into 2 lessons / learning outcomes:

- **Introduction to acoustic simulation and design**. Is an introduction to acoustic simulation software used in designing and aiming a (line-array) sound system. During the course the whole work flow is described, starting from measuring the room dimensions and ending in aiming the cabinets in a line array.
- **System tuning and analyzing**. In this lesson the participants will take a look at software designed to analyze different aspects of audio signals. After taking measurements and analyzing them the participants are introduced to ways affecting the performance of the sound system based on the results.

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

OPERATIONAL GOALS

After completion of this module the participants:

- ✓ Will be able to design and aim a sound system with the help of acoustic simulation software
- ✓ Can take valid measurements using an audio measurement/analysing software
- ✓ Will be able to optimize a sound system using measurement software

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

LESSONS: AUDIO (ADVANCED)

LESSON 1: “Introduction to acoustic simulation”

AIM AND CONTENTS OF THE LESSON

This lesson is an introduction to acoustic simulation software used in designing and aiming a (line-array) sound system. During the course the whole work flow is described, starting from measuring the room dimensions and ending in aiming the cabinets in a line array. The different needs for the sound systems, depending on the content of the program are also discussed.

- Workflow:
    - Measuring and modelling the venue
    - Placement
    - Aiming
- Different needs for the sound system:
    - Tonal balance for musical events
    - Even sound pressure through out the venue for corporate events and speech

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

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the features of the program chosen for the lesson. The facilitator should go through all the relevant features before the participants start doing their practice.
- **Practice examples**: During the second part of the lesson facilitator should introduce an exercise for the participants to do. Facilitator should provide relevant information for the practice example:
    - Dimensions for the imaginary or real venue
    - If the system should be flown or stacked
    - Are front fills or delay arrays going to be used
    - The model and amount of loudspeakers used in the exercise

    Using this information the participants should design a sound system for a musical event as well as corporate event. The facilitator should solve problems the participants might have on a screen using the software in question and constantly make sure no participant gets stuck on a part of the exercise. (2-4 hours)

- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. Taking a look at practice examples of the participants and discussing them in a group would be beneficial (15-30 minutes)

EXPECTED OUTPUTS / RESULTS

- Ability to model a room or venue in an acoustic simulation software
- Ability to decide what kind of speaker system to use based on simulation
- Ability to aim and place loudspeakers in the most beneficial way

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

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals and playing audible examples relevant to the presentation. Describe the workflow while showing visuals from the software.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Laptops and acoustic simulation software for every participant, may use their own computers, but the software must be same for everybody

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 2: “System tuning and analyzing”

AIM AND CONTENTS OF THE LESSON

During this lesson the participants will take a look at software designed to analyze different aspects of audio signals. After taking measurements and analyzing them the participants are introduced to ways affecting the performance of the sound system based on the results, providing them necessary information to optimize a sound system.

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the workflow and features of the measurement software. Showing all the features and relevant settings that enable everyone to get identical measurement results during practice is essential.
- **Practice examples**: During the second part of the lesson participants will take measurements of a sound system they have built with the facilitator. If possible use a design made by the participants during “Introduction to acoustic simulation”-lesson. All participants should measure frequency response of every loudspeaker type:
    - Top loudspeakers, if it is a line array make sure to measure it as an array, not single cabinets. Measure one side at a time , left or right. Measuring only one side is enough.
    - Subwoofers, if you are using an array, make sure to measure the array as a whole and not just single subwoofers. If you are using L-R setup measure just one side.
    - Optional fill or delay speakers
- After measuring the frequency response, analyse the results and optimise the frequency response using EQ. Then move to phase response and align all the speakers.
- (min. 120 minutes)
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed and discuss with the participants in case they have questions (15-30 minutes)

EXPECTED OUTPUTS / RESULTS

- Ability to take valid measurements
- Ability to act based on the measurements

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

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, using the software as an example as you go through the work flow and features
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes or 30 minutes every 90 minutes

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- A complete sound system with at least top- and sub loudspeakers
- Mixing console
- Source for music
- Measurement microphone(s)
- Laptops and measurement software for every participants. Participants may use their own computers as long as the software is same for everyone.
- USB-microphone preamplifiers that are compatible with the software

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.
- A real stage with a real PA would be an ideal practice environment

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

CHAPTER 3: VIDEO (ADVANCED)

DURATION

Minimum of 9 hours excluding practice. Duration can be adapted according to participant needs and engagement.

INTRODUCTION

This module provides the backgrounds of video technology. It includes the advance of video signals and formats, most used interfaces and connectors, advances processes of videocameras, displays and projectors and other related technological topics such as video editing tools, video mixers and conference platforms.

KEY CONCEPTS / KEY WORDS

Video signals, video formats, video compression, video coding, cameras, video editing, video mixers, displays, projectors, conference platforms, interfaces

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

OVERALL OBJECTIVES / COMPETENCES

This module is divided into 3 lessons / learning outcomes:

1. **Video signal types, standards and formats**. The lesson introduce advance the characteristics of video stream, interlaced scaning concept and the diferents video formats and codecs.

2. **Interfaces and cables for video**, **digital cameras, video editing and video mixer.**
   It provides a description of the the interfaces for professional use and cables used to carry video signals(Optical, Triax, Multicore,...), advanced configuration of a video camera and video editind with adobe Premiere. At the end will be expalin a video mixer configuration.

3. **Displays, projectors and digital conference platforms.** This lesson introduces the students to the advance characteristics of displays and projectors for professional use. The last section exposes the advance of conference platforms (Adobe connect).

OPERATIONAL GOALS

After completion of this module the participants:

- ✓ Will have enough information to start practicing in real life situations.
- ✓ Will have advance knowledge about the theory of video and the elements used in video capture, editing, broadcasting and video mixer.
- ✓ Will be ready to work in real life situations.

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

LESSONS: VIDEO (ADVANCED)

LESSON 1: “Video signal types, standards and formats”

AIM AND CONTENTS OF THE LESSON

In this lesson, participants are introduced to the advance concept of video signal and the different formats.

- Advanced characteristics of video stream Digital video signals
- Interlaced Scanning Concept

Advanced video formats:

- H.264 or MPEG-4 Part 10 AVC
- H.265 HECV
- VP9

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the different attributes of the advance video signals types. During the presentation the facilitator should show different video and image examples to illustrate the theoretical concepts.
- **Exercises**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

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

EXPECTED OUTPUTS / RESULTS

- Advance level of knowledge on video signals
- Ability to identify the advance characteristics of video signals.
- Know the advanced in video formats.

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 2: “Interfaces and cables for video, digital cameras, video editing and video mixer”

AIM AND CONTENTS OF THE LESSON

In this section, it provides a description of the interfaces for professional use and cables used to carry video signals (Optical, Triax, Multicore,...), advanced configuration of a video camera, video editind with adobe Premiere and video mixer settings.

- CoaXPress
- Triaxial cable (Triax)
- Multicore cable
- Optical fiber
- Video adapters
- Advance video setting
- Video Mixer configuration

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the different attributes of the advance video interfaces. During the presentation the facilitator should show different cables for video with examples to illustrate it. It should be advisable to show real connectors to the participants, in the second part will be shown the advance configuration of a video camera and video editing with adobe Premiere, at the end will be show a video mixer configuration for professional use.
- **Exercises**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

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

EXPECTED OUTPUTS / RESULTS

- Advance level of knowledge video interfaces and connectors, camera and video editing software.
- Ability to identify the different interfaces and cables, the advance video camera settings and video mixer settings.

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Examples of real connectors and cables.
- Video camera
- Editing software (Adobe Premiere)
- Video mixer

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

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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

LESSON 3: “Displays, projectors and digital conference platforms”

AIM AND CONTENTS OF THE LESSON

In this lesson lesson introduces the student to the advance characteristics of displays and projectors for professional use. The last section exposes the advance of conference platforms (Adobe connect) and others conference solutions for education.

Displays:

OLED (Organic Light-Emitting Diode)

- PMOLED/AMOLED

Projectors:

- LcoS
- Laser-Beam-Steering (LBS)
- Holographic Laser Projection (HLP)
- Rear projectors

Digital Conference Platforms:

- Adobe Connect

METHODS OF IMPLEMENTATION

- **Presentation**: The first part of the lesson will consist of a presentation explaining the different attributes of the professional displays and projectors. During the presentation, the facilitator should show different examples of displays and projectors to illustrate the characteristics and differences between different types
- **Exercises**: After the theoretical lesson, students should take the test. Once the test is finished, participants should check the errors by asking the facilitator for any questions that are unclear.
- **Summary and discussion**: At the end of the lesson, the facilitator will summarise the main concepts exposed. (10-15 minutes)

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

EXPECTED OUTPUTS / RESULTS

- Advance level of knowledge on displays, projectors and theirs features.
- Ability to identify the advance characteristics of displays and projectors.
- Advance configuration on Digital Conference Platforms: Adobe Connect and others educational platforms.

DIDACTIC RECOMMENDATIONS

- **Presentation:** Provide a well-structured presentation with clear and plain English speech, showing visuals examples relevant to the presentation.
- **Summary and discussion:** Try to make sure that everyone understood the main aspects, by discussion if possible. If the participants find it hard to engage in a discussion try asking questions instead and spark discussion that way.
- **Breaks**: It is also important to make a break of around 15 minutes every 45 minutes.

EQUIPMENT

- Power Point presentation
- TV screen or projector and screen.
- Flipchart or whiteboard
- Paper and pens
- Examples of different real displays and projectors.
- Video distributor to provide the same video signal (analogue and digital ones) to several displays and projectors simultaneously.
- PC or Mac for the Adobe Connect software

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

TIPS AND TRICKS

- Set everything up before the lesson starts (especially the technical equipment).
- Place participants in comfortable locations, with a good position to see the screen and to interact with each other.

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