Global Certificate in Professional Lighting Design

Lighting Fixtures and Controls

Lighting Fixtures: Lighting fixtures, also known as light fittings or luminaires, are devices that contain one or more electric lamps and distribute the light they produce. They come in various shapes, sizes, and designs, and are used for different applications, such as general, task, and accent lighting.

Lamps: Lamps, also known as light bulbs, are the actual source of light in a lighting fixture. They come in different types, such as incandescent, fluorescent, and LED, and have different characteristics, such as color temperature, efficiency, and lifespan.

Color Temperature: Color temperature is a measure of the color of light produced by a lamp. It is expressed in degrees Kelvin (K) and ranges from warm (low) to cool (high) colors. Warm colors have a yellow or orange tint and are typically used for residential applications, while cool colors have a blue or white tint and are used for commercial and industrial applications.

Efficiency: Efficiency is a measure of how well a lamp converts electrical energy into light. It is expressed as a percentage and is affected by factors such as the type of lamp, the design of the lighting fixture, and the operating conditions.

Lifespan: Lifespan is a measure of how long a lamp lasts before it needs to be replaced. It is expressed in hours and varies depending on the type of lamp and the operating conditions.

Controls: Controls are devices that allow users to adjust the level, color, and direction of light in a space. They come in different types, such as manual, automatic, and remote controls, and are used for different applications, such as energy savings, comfort, and aesthetics.

Dimming: Dimming is the process of reducing the light output of a lamp by adjusting its power supply. It is used for different purposes, such as energy savings, mood setting, and task performance.

Color Mixing: Color mixing is the process of combining lights of different colors to create a desired color effect. It is used for different applications, such as architectural lighting, theatrical lighting, and retail lighting.

Lighting Design: Lighting design is the process of planning and creating lighting solutions that meet the functional, aesthetic, and energy requirements of a space. It involves various tasks, such as site analysis, concept development, fixture selection, control programming, and documentation.

Lighting Layout: Lighting layout is the arrangement of lighting fixtures in a space to achieve the desired lighting effects. It involves various factors, such as the type of fixture, the mounting height, the aiming

direction, and the spacing distance.

Lighting Calculations: Lighting calculations are mathematical formulas used to predict the light levels, uniformity, and glare in a space. They are used to verify the compliance with the lighting standards and to optimize the lighting performance.

Lighting Controls: Lighting controls are devices that allow users to adjust the light output, the color, and the direction of light in a space. They include manual switches, dimmers, sensors, and networks, and are used for different purposes, such as energy savings, comfort, and safety.

Lighting Zones: Lighting zones are areas within a space that have different lighting requirements. They are used to divide a space into smaller areas and to apply different lighting levels, colors, and controls to each area.

Lighting Scenes: Lighting scenes are pre-programmed lighting settings that allow users to change the lighting mood and atmosphere in a space. They are used for different applications, such as entertainment, presentation, and relaxation.

Emergency Lighting: Emergency lighting is the backup lighting system that provides illumination during power outages or failures. It is used to ensure the safety and security of people in a space and to facilitate the evacuation of the building.

Exit Lighting: Exit lighting is the signage that indicates the location of the exits and the escape routes in a building. It is used to guide people safely and quickly out of the building in case of an emergency.

Daylighting: Daylighting is the use of natural light to illuminate a space. It is used to reduce the artificial light demand, to enhance the visual comfort, and to create a connection between the indoor and the outdoor environments.

Sustainable Lighting: Sustainable lighting is the design and operation of lighting systems that minimize the environmental impact and maximize the energy efficiency. It involves various strategies, such as daylighting, LED technology, control optimization, and maintenance practices.

Light Pollution: Light pollution is the excessive or misdirected artificial light that causes adverse effects on the environment and on human health. It is caused by various sources, such as buildings, streets, and billboards, and is controlled by various measures, such as lighting codes, shielding, and dimming.

Lighting Standards: Lighting standards are guidelines and regulations that establish the minimum requirements for lighting design, installation, and maintenance. They are developed by various organizations, such as the Illuminating Engineering Society (IES), the International Commission on Illumination (CIE), and the National Fire Protection Association (NFPA).

Lighting Codes: Lighting codes are laws and regulations that govern the use and the control of lighting

systems in a jurisdiction. They are enforced by various authorities, such as the building department, the electrical inspector, and the fire marshal.

Lighting Quality: Lighting quality is the subjective evaluation of the lighting performance, based on the criteria such as the visual comfort, the color rendering, and the glare. It is affected by various factors, such as the light source, the lighting fixture, the control system, and the user's preferences.

Lighting Economics: Lighting economics is the analysis of the costs and the benefits of lighting systems, based on the criteria such as the initial investment, the operating cost, the energy savings, and the payback period. It is used to evaluate the feasibility and the profitability of lighting projects and to make informed decisions.

Lighting Education: Lighting education is the process of acquiring and sharing the knowledge and the skills related to lighting design, technology, and application. It is offered by various institutions, such as universities, colleges, and training centers, and is delivered through various formats, such as classroom instruction, online learning, and hands-on training.

Lighting Research: Lighting research is the scientific investigation of the lighting phenomena, the lighting technology, and the lighting application. It is conducted by various organizations, such as universities, laboratories, and industries, and is published through various channels, such as journals, conferences, and reports.

Lighting Innovation: Lighting innovation is the creation and the implementation of new ideas, products, and services related to lighting design, technology, and application. It is driven by various factors, such as the market demand, the technological advancement, and the regulatory requirements, and is realized through various processes, such as research and development, prototyping, and testing.

Lighting Industry: Lighting industry is the collection of companies, organizations, and individuals that are involved in the production, distribution, and installation of lighting products and services. It is a global and dynamic industry, with various segments, such as the residential, the commercial, the industrial, and the outdoor lighting.

Lighting Market: Lighting market is the place where the buyers and the sellers of lighting products and services meet and interact. It is a competitive and complex market, with various actors, such as manufacturers, wholesalers, retailers, contractors, and designers, and with various factors, such as the demand, the supply, the price, and the promotion.

Lighting Trends: Lighting trends are the emerging and the evolving phenomena in the lighting industry and market. They are influenced by various factors, such as the technology, the society, the economy, and the environment, and are reflected in various aspects, such as the design, the function, the performance, and the sustainability.

Lighting Future: Lighting future is the vision and the expectation of the lighting industry and market. It is characterized by various opportunities and challenges, such as the digitalization, the connectivity, the personalization, and the customization, and is shaped by various forces, such as the innovation, the regulation, and the collaboration.

In conclusion, lighting fixtures and controls are essential components of the lighting design and application, with various terms and vocabulary that are important to understand and to use. This explanation has provided a comprehensive and detailed overview of the key concepts, the practical applications, and