

IES COURSE
FUNDAMENTALS OF LIGHTING



Student Manual



IES Educational Program

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Master Outline for Fundamentals of Lighting

PART 1 – Modules 1 - 5

- Module 1 – Overview (History, Professional Practice, Physics, Vision, Color, Light and Health)
- Module 2 – Electric light sources and Auxiliary Devices
- Module 3 - Daylighting
- Module 4 – Luminaires
- Module 5 – Controls

PART 2 – Modules 6 - 8

- Module 6 – Lighting Metrics, Photometry, Calculations and Rendering
- Module 7 – Codes and Standards, Economics
- Module 8 – Lighting Design Process and Techniques, Sustainability and Commissioning

PART 3 – Modules 9 and 10

- Module 9 – Lighting for Interiors
- Module 10 – Lighting for Exteriors

TABLE OF CONTENTS

Module 1 – History of Light, Professional Practice, Defining Light, Vision, Color, and Light and Health

- (4) Learning Objectives*
- 1.0 Introduction
- 2.0 A Brief History of Light and Lighting
- 3.0 Professional Lighting Practitioner
- 4.0 Defining Light
 - 4.1 What is Light?
 - 4.2.1 Early Studies of Radiation
 - 4.2.2 Black Body Radiation
 - 4.2.3 Maxwell’s Electromagnetic Waves
 - 4.2.4 Atomic Theory and Radiation
 - 4.2.6 The Phenomenon of Electroluminescence
 - 4.2.7 What Does the Future Hold?
 - 4.2.8 Physical Behaviors of Light and the Nature of Color
 - 4.3 Summary- How Light Works
- 5.0 Vision
 - 5.1 The Four Components of Vision
 - 5.1.1 Source
 - 5.1.2 Reflecting Surface (Modifier)
 - 5.1.3 Eye (Receiver)
 - 5.1.3.1 Optical Components
 - 5.1.4 Brain (Interpreter)
 - 5.2 Visual Acuity
 - 5.2.1 Visibility
 - 5.2.1.1 Size
 - 5.2.1.2 Luminance
 - 5.2.1.3 Contrast
 - 5.2.1.4 Viewing Time
 - 5.2.1.5 Color
 - 5.2.1.6 Age

- 6.0 Color
 - 6.1 Physical Characteristics of Color
 - 6.2 Perceptual Characteristics of Color
 - 6.3 Chromaticity and Color Characterization
 - 6.4 Quantifying Color for Illuminating Engineering and Lighting Design
 - 6.5 Color Appearance of Light Sources
 - 6.6 Color Rendering – How Light Affects the Color of Objects
 - 6.7 Color Temperature and CRI – Useful References
- 7.0 Light and Health
 - 7.1 Circadian Effects
 - 7.1.1 Overview of the Circadian System
 - 7.1.2 Circadian Receptors
 - 7.1.3 Biological Clock
 - 7.1.4 Output Rhythms
 - 7.1.5 Sleep/Wake Cycle and Alertness
 - 7.1.6 Core Body Temperature
 - 7.1.7 Hormone Production
 - 7.2 Regulation of Circadian Rhythms by Light
 - 7.2.1 Lighting Characteristics Affecting Circadian Rhythms
 - 7.3 Applications
 - 7.4 Flicker
 - 7.5 Tissue Damage from Light
 - 7.5.1 UV Radiation – Skin Damage
 - 7.5.2 Visible Radiation – Retinal Damage
 - 7.5.3 Infra-Red (IR) Radiation
 - 7.5.4 Hazardous Light Sources – IES Classification
 - 7.6 Light Operating Through the Visual System
 - 7.6.1 Eyestrain
 - 7.6.2 Falls
 - 7.7 Unresolved Issues
 - 7.7.1 Cancer
 - 7.7.2 Vitamin D Deficiency
 - 7.7.3 The Healing Sun
 - 7.8 Health Effects of Light Pollution
- 8.0 Summary

Annex A – Recommended Reading
References

Module 2 – Electric Light Sources and Auxiliary Devices

(4) Learning Objectives

- 1.0 Legacy Electric Light Sources
 - 1.1 Introduction
 - 1.2 Electric Light Sources
 - 1.2.1 Light Source Efficacy and Energy Legislation
 - 1.2.2 Basic Definitions
 - 1.3 Filament Light Sources
 - 1.3.1. Filament Light Source Construction
 - 1.3.1.1 Incandescent Light Sources
 - 1.3.1.2 Vibration Service and Rough Service Light Sources
 - 1.3.1.3 Filament Bulb Definition
 - 1.3.1.4 Filament Bulb Designations
 - 1.3.1.5 Filament Gases
 - 1.3.1.6 Filament Bases
 - 1.3.1.7 Filament Current Carrying Capacity
 - 1.3.1.8 Coatings
 - 1.3.1.9 Reflector Light Source (PAR, R) Coatings
 - 1.3.1.10 Light Source Life
 - 1.3.2 Halogen Light Sources
 - 1.3.2.1 Types of Halogen Light Sources
 - 1.3.2.2 Halogen Features
 - 1.3.2.3 Light and Color Quality for Incandescent and Halogen
 - 1.4 Energy Independence and Security Act of 2007
 - 1.4.1 Energy Star Resources for Lighting Partners
 - 1.4.2 Next Generation Lighting Programs
 - 1.5 Gas Discharge Light Sources
 - 1.5.1 Overview of Low Pressure Discharge Light Sources
 - 1.5.2 Fluorescent Light Sources
 - 1.5.2.1 Fluorescent Light Source Construction and Operation
 - 1.5.2.2 Fluorescent Light Source Components
 - 1.5.2.3 Light Source Credits
 - 1.5.2.4 Fluorescent Light Source Identification
 - 1.5.2.5 Fluorescent Light Source Attributes
 - 1.5.2.6 Additional Fluorescent Light Source Considerations
 - 1.5.2.7 Auxiliary Equipment for Fluorescents
 - 1.5.3 Electrodeless Fluorescent and Induction Light Sources
 - 1.5.3.1 Toroidal and Ring Induction
 - 1.5.3.2 Re-entrant Cavity Light Sources
 - 1.5.4 Low Pressure Sodium
 - 1.5.5 Cold Cathode
 - 1.5.6 Rare Gas Light Sources
 - 1.5.7 Overview of High Intensity Discharge (HID)
 - 1.5.7.1 HID Construction
 - 1.5.7.2 HID Identification
 - 1.5.7.3 HID Source Life
 - 1.5.7.4 Metal Halide
 - 1.5.7.5 Ceramic Metal Halide (CMH)
 - 1.5.7.6 Electrodeless Metal Halide (Plasma)
 - 1.5.7.7 High Pressure Sodium
 - 1.5.7.8 HID Ballasts
- 2.0 Solid State Light Sources
 - 2.1 Light Emitting Diode (LED) Principle of Operation



- 2.1.1 LED Construction
- 2.1.2 White Light LEDs
- 2.1.3 Color Stability
- 2.1.4 Phosphors
- 2.1.5 Package
- 2.1.6 LED Drivers
- 2.1.7 Flicker
- 2.1.8 Dimming
- 2.1.9 Blue Light Hazard
- 2.1.10 LED Life Ratings
- 2.1.11 Applications
- 2.1.12 Equivalence
- 2.2 Organic Light Emitting Diode (OLED)
 - 2.2.1 OLED Projections
- 2.3 Other Light Sources
 - 2.3.1 Electroluminescent Lighting
- 2.4 Summary

Module 3 – Daylighting

(4) Learning Objectives

- 1.0 Daylighting
 - 1.1 Introduction
 - 1.2 Daylight as a Source
 - 1.3 Reasons for Using Daylight
 - 1.3.1 Aesthetics
 - 1.3.2 Color Quality
 - 1.3.2.1 Color Temperature of Daylight
 - 1.3.2.2 Color Rendering of Daylight
 - 1.3.3 Energy Issues
 - 1.3.4 Benefits to Occupants
 - 1.4 Other Considerations
 - 1.4.1 Daylight Glare
 - 1.4.2 Daylight Availability
 - 1.4.3 Reflected Light
 - 1.5 Daylight Delivery Systems
 - 1.5.1 Skylights
 - 1.5.2 Windows
 - 1.5.3 Light Shelves
 - 1.5.4 Roof Monitors
 - 1.5.5 Clerestories
 - 1.5.6 Solar Tubes
 - 1.6 Daylight Control Methods
 - 1.6.1 Overhangs
 - 1.6.3 Fins
 - 1.6.4 Louvers
 - 1.7 Interaction with Electric Lighting
 - 1.8 Daylighting Design
 - 1.8.1 Performance Parameters
 - 1.8.2 Daylight Illuminance Metrics
 - 1.8.3 Annual Daylight Performance Metrics
 - 1.8.4 Annual Light Exposure Metrics
 - 1.9 Summary

Module 4 – Luminaires

(4) Learning Objectives

- 1.0 Introduction
 - 1.1 Luminaire Forms and Optics
 - 1.1.1 Material Properties to Control Light
 - 1.1.1.1 Transmission
 - 1.1.1.2 Refraction
 - 1.1.1.3 Absorption
 - 1.1.2 Methods of Light Control for Luminaires
 - 1.1.2.1 Four Methods of Light Control
 - 1.1.3 Light Control Components
- 2.0 Classifying Luminaires
 - 2.1 Classification by Application
 - 2.2 Classification by Distribution
 - 2.3 Classification by Mounting Method
 - 2.3.1 Indoor Mounted Luminaires
 - 2.3.2 Exterior Luminaires
- 3.0 Additional Luminaire Attributes
 - 3.1 Thermal Performance
 - 3.2 Mechanical
 - 3.3 Acoustical
 - 3.4 Maintenance
- 4.0 Summary

Module 5 – Controls

(4) Learning Objectives

- 1.0 Introduction
 - 1.1 Lighting Controls – Design Process
 - 1.2 Lighting Control Types
 - 1.2.1 Control Signal Types
 - 1.2.1.1 Low Voltage Wiring
 - 1.2.1.2 Wireless
 - 1.3 Control Zones
 - 1.4 Lighting Control Design Strategies
 - 1.4.1 Multi-Level Switching, Bi-Level Dimming, Building Automation Systems
 - 1.4.2 Daylight Compensation
 - 1.5 Integration with Emergency Lighting
 - 1.6 Exterior Controls
- 2.0 Summary

PART II

Module 6 – Photometry, Metrics and Computer Calculations

(4) Learning Objectives

- 1.0 Lighting Metrics
 - 1.1 Luminous Flux and Luminous Intensity
 - 1.2 Illuminance
 - 1.3 Reflectance
 - 1.4 Luminous Exitance
 - 1.5 Luminance
- 2.0 Photometric Data
 - 2.1 The Photometric Process
 - 2.1.1 Example Photometric Report
- 3.0 Other Photometric Issues
 - 3.3.1 Testing Facilities
 - 3.3.2 Relative vs. Absolute Photometry
 - 3.3.3 Visual Comfort Probability (VCP) Table
 - 3.3.4 Near-Field vs. Far-Field Photometry
- 4.0 Lighting Calculations
 - 4.1 Role and Use of Lighting Calculations
 - 4.2 Determination of Illuminance Category
 - 4.3 The Lumen Method
 - 4.3.1 The Lumen Method Calculation
 - 4.3.2 The Three Surface Model
 - 4.3.2.1 Workplane
 - 4.3.2.2 Luminaire Plane
 - 4.3.2.3 Room Volumes/Cavities
 - 4.3.3 Applying the Lumen Method
 - 4.3.4 Sample Problem #1: Office
 - 4.3.5 Additional Lumen Method Problems
 - 4.3.5.1 Lumen Method Problem #1: Office
 - 4.3.5.2 Lumen Method Problem #2: Office
 - 4.3.5.3 Lumen Method Problem #3: Office
 - 4.4 The Point-by-Point Method
 - 4.4.1 General Principles of the Point Method
 - 4.4.2 Luminous Intensity
 - 4.4.3 Distance
 - 4.4.4 Orientation of the Surface
 - 4.4.5 Sample Point-by-Point Problems
 - 4.4.5.1 Example #1
 - 4.4.5.2 Example #2
 - 4.4.5.3 Example #3
 - 4.4.6 Class Problems
 - 4.4.6.1 Problem #1
 - 4.4.6.2 Problem #2
 - 4.5 Light Loss Factors
 - 4.5.1 Calculating the LLF
 - 4.6 Considerations Affecting Lighting Calculations
 - 4.6.1 Light Loss Factors in Computer Calculations
- 5.0 Renderings
 - 5.1 Overview of Rendering Generation
 - 5.2 Computational Basis for Renderings
 - 5.3 Display Properties and Limitations
 - 5.4 Evaluating Lighting Analysis Software

6.0 Summary

Annex A – Computer Calculation Images

Annex B – Sine and Cosine Tables

References

Module 7 – Codes and Standards, Economics

(4) Learning Objectives

- 1.0 Introduction
 - 1.1 Authority Having Jurisdiction (AHJ)
- 2.0 Safety Codes – Product Based and Application Based
 - 2.1 National Electric Code (NEC)
 - 2.1.1 National Fire Protection Association (NFPA) 101 – Life Safety Code
 - 2.2 Underwriters Laboratories (UL)
 - 2.3 Canadian Standards Association
 - 2.4 National Building Code, Canada (NBC Canada)
 - 2.5 National Fire Code of Canada
 - 2.6 ERL Semko (Intertek)
- 3.0 Energy Management
 - 3.1 Trends
 - 3.2 Basic Strategies
 - 3.2.1 Daylighting
 - 3.2.2 Electric Lighting
 - 3.2.3 Lighting Controls
 - 3.3 Retrofitting
 - 3.4 New Construction
 - 3.4.1 Designing for Daylighting
 - 3.4.2 Electric Lighting Equipment
 - 3.4.3 Lighting Controls
 - 3.4.4 Exit Sign Upgrades
 - 3.5 Global Energy Picture
 - 3.6 Ongoing Efforts in Energy Efficiency
- 4.0 Lighting Product Application Resources, Lighting Efficiency Codes, Lighting Standards
 - 4.1 Product Applications
 - 4.1.1 U.S. Department of Energy
 - 4.1.2 Lighting Consortia
 - 4.1.3 Non-Regulatory Government Programs
 - 4.2 Lighting Codes
 - 4.2.1 Legislation
 - 4.2.2 ANSI/ASHRAE/IES 90.1
 - 4.2.3 International Energy Conservation Code (IECC®)
 - 4.2.4 Equipment Regulations
 - 4.2.5 Green Building Codes and Rating Systems
- 5.0 Economics
 - 5.1 The Role of Economic Analyses
 - 5.2 Estimating Costs
 - 5.3 Simple Payback
 - 5.4 A Simple Rate of Return
 - 5.5 Cost of Light
 - 5.6 Life Cycle Costing Benefit Analysis (LCCBA)
 - 5.6.1 Time Value of Money
 - 5.6.2 General Assumptions
 - 5.6.3 Considering Systems with Unequal Lives
 - 5.6.4 Disposal Costs

- 5.6.5 Converting Costs to Present Worth
 - 5.6.5.1 Discounted Payback and Rate of Return
- 5.7 Present Worth Example Problems
- 5.8 Economic Analysis Software
- 6.0 Summary

Module 8 – Lighting Design Process and Techniques, Sustainability and Commissioning

- (4) Learning Objectives*
- 1.0 Introduction
 - 1.1 Building Design Process
 - 1.2 Pre-Design
 - 1.3 Traditional Work Phases
 - 2.0 Lighting Design and the Building Process
 - 2.1 Programming Phase
 - 2.2 Schematic Design
 - 2.3 Design Development
 - 2.4 Contract/Construction Documents
 - 2.5 Bidding, Construction and Occupancy
 - 2.5.1 Bidding
 - 2.5.2 Construction
 - 2.5.3 Post Occupancy Evaluations
 - 3.0 Building Information Management (BIM)
 - 4.0 Sustainable Projects
 - 5.0 System Factors
 - 5.1 Flexibility
 - 5.2 Controls
 - 5.3 Acoustics
 - 5.4 HVAC
 - 5.5 Ceiling Systems
 - 5.6 Installation
 - 5.7 Sustainability
 - 5.8 Maintenance
 - 6.0 Prescribed Factors
 - 7.0 Lighting Design Application Considerations
 - 7.1 Light Sources
 - 7.2 Efficacy
 - 7.3 Life and Lumen Maintenance
 - 7.3 Auxiliary Equipment
 - 7.4 Starting and Restrike
 - 7.5 Color
 - 7.6 Directional Intensity
 - 7.7 Physical Environment
 - 7.8 Damage and Physical Harm
 - 7.8.1 Potential Damage to Objects
 - 7.8.2 Potential Damage to People
 - 7.9 Lamp Geometry
 - 7.10 Legislation
 - 7.10.1 Luminous Efficacy Legislation
 - 8.0 Electric Lighting Systems
 - 8.1 Fundamental Lighting Systems
 - 8.2 Hardware
 - 9.0 A Lighting Scheme

- 10.0 Sustainability
 - 10.1 Background and History
 - 10.2 Light as a Resource
 - 10.3 Basic Concepts in Sustainability
 - 10.3.1 Optimize Daylighting
 - 10.3.2 Electric Lighting Reduction
 - 10.3.3 Light Pollution
 - 10.4 Assessing Sustainability
 - 10.4.1 Energy Efficiency
- 11.0 Sustainable Building Design Rating Systems, Codes and Standards
 - 11.1 LEED®
 - 11.1.1 LEED Ratings
 - 11.1.2 The LEED Structure
 - 11.1.3 How It Works
 - 11.1.4 Lighting Related Criteria
 - 11.1.5 LEED Accredited Professionals and Resources
 - 11.2 International Green Construction Code (IgCC)
 - 11.3 Living Building Challenge
 - 11.4 GREEN GLOBES®
 - 11.4.1 Lighting Related Criteria
 - 11.5 New Buildings Institute (NBI) Advanced Buildings®
- 12.0 Commissioning
 - 12.1 Responsibilities
 - 12.2 Documentation
 - 12.3 Commissioning Tests
- 13.0 Summary

Module 9 – Lighting for Interiors

(4) Learning Objectives

- 1.0 Introduction
 - 1.1 Contrast and Stimulation
 - 1.1.1 Low-Contrast Environment
 - 1.1.2 High-Contrast Environment
 - 1.1.3 Variation
 - 1.2 Glare
 - 1.2.2 Reflected Glare
 - 1.3 Direction and Distribution
 - 1.3.1 Vertical Surface Illumination
 - 1.4 Richard Kelly's Three Elements of Light
 - 1.4.1 Ambient Luminescence
 - 1.4.2 Focal Glow
 - 1.4.3 Play of Brilliants
 - 1.5 John Flynn's Research – Subjective Spatial Impressions
 - 1.5.1 Impressions of Spaciousness
 - 1.5.2 Impressions of Perceptual Clarity
 - 1.5.3 Impression of Pleasantness
 - 1.5.4 Vertical Surface Illumination
 - 1.5.5 Additional Research Resources
- 2.0 Interior Lighting Applications
 - 2.1 Residential Lighting Design
 - 2.1.1 Living Room Lighting
 - 2.1.2 Dining Room Lighting
 - 2.1.3 Kitchen Lighting



- 2.1.4 Bathroom Lighting
- 2.1.5 Bedroom Lighting
- 2.2 Office and Corporate Lighting Design
- 2.3 Hospitality Design
 - 2.3.1 Hotel Lobby Lighting
- 2.4 Restaurant Lighting
- 2.5 Healthcare/Institutional Interior Lighting
- 2.6 Retail Lighting
- 2.7 Industrial Lighting
 - 2.7.1 Warehouse Lighting
- 3.0 Summary

Module 10 – Lighting for Exteriors

- (4) Learning Objectives*
- 1.0 Introduction
 - 1.1 Horizontal and Vertical Illuminance in Exteriors
 - 1.2 Luminance
 - 1.3 Visibility
 - 1.4 Glare
 - 1.5 Light Trespass
 - 1.6 Sky Glow
 - 1.7 Ordinances
- 2.0 Exterior Elements – Landscaping and Street Furniture
 - 2.1 Safety and Security
- 3.0 Spectral Effects
- 4.0 Exterior Lighting Applications
 - 4.1 Roadway Lighting
 - 4.1.1 Roadway Categorization
 - 4.2 Pedestrian Areas Adjacent to Roadway
 - 4.2.1 Sidewalks
 - 4.2.2 Pedestrian Walkways
 - 4.3 Intersections
 - 4.4 Roundabouts
 - 4.4.1 Crosswalks
 - 4.5 Tunnels
 - 4.6 Parking Facility Lighting
 - 4.7 Sports Lighting
 - 4.8 Retail and Commercial
 - 4.9 Structures
- 5.0 Exterior Lighting Techniques
 - 5.1 Luminaire Selection
 - 5.2 Placement of Luminaires
 - 5.3 Color
- 6.0 Landscape Lighting
- 7.0 System Controls
 - 7.1.1 Time Clocks
 - 7.1.2 Photocells
 - 7.1.3 Motion Sensors
- 8.0 Summary

PART 1

Module 1: History of light, Professional Practice, Defining Light, Vision, Color, and Light and Health

Learning objectives

Upon completion of this Module you will be able to:

1. Analyze the history of light and the role of the lighting designer in the building design process.
2. Describe the physical principles central to the nature of light.
3. Identify the way the human visual system processes light and color, engendering positive emotional and physical responses.
4. Describe important effects of light on human health which promotes physical well-being.

1.0 Introduction

This module provides an overview of the history of light, describes some principles that are central to the nature of light, components of the eye and an overview of the current understanding of how the human visual system light and some basic physics works, important effects of light on human health, and the relationship between light, color and the perception of color by the human visual system.

2.0 A Brief History of Light and Lighting

~20,000BC to 1800AD The first evidence of the use of flame in lamps has been dated to approximately 20,000BC. From that time until the opening decade in the 1800's, the open flame was the sole technology employed for human-made light (see DiLaura, A History of Light and Lighting).

- First as fire, then torches, then oil lamps followed by candles.
- The main components of a simple oil lamp: wick and oil reservoir.
- The earliest lamps were nothing more than a stone with a bowl shaped depression or seashell, containing some type of oil or animal fat that moistened a wad of dried moss or other dry, absorbent plant matter that acted as a wick.
- The porous wick would draw up oil via capillary action while it burned, which also kept the wick from being consumed too rapidly. Lamps provided a somewhat more controlled and slow burning flame than a torch, and could be kept burning not only for light but in order to light larger fires for cooking or warmth.
- When humans had started to create pottery, circa 30,000BC, oil lamps became more elaborate, with enclosed reservoirs and defined places to insert the wick. But the operation was much the same: the reservoir would be filled with fuel, the wick inserted and allowed to draw up fuel, and the lamp lighted from another lamp or fire already burning.
- Wicks typically consisted of bound reeds or fibrous straw. One can readily imagine early lighting engineers experimenting with different wick materials, fuels, pottery reservoir materials and lamp designs.