

# **PHYSICAL WORK ENVIRONMENT**

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# LECTURE OUTLINE

1. The Visual Environment and Lighting
2. The Auditory Environment and Noise
3. Climate Control in the Work Environment

# LECTURE OUTLINE

- Visual environment
  - Physics of light
  - Visibility
  - Lighting system



# **VISUAL ENVIRONMENT**

# VISUAL ENVIRONMENT AND LIGHTING

- About 80% of the information input to the human brain comes from visual stimuli
- Topics:
  - The physics of light
  - Visibility
  - Lighting systems

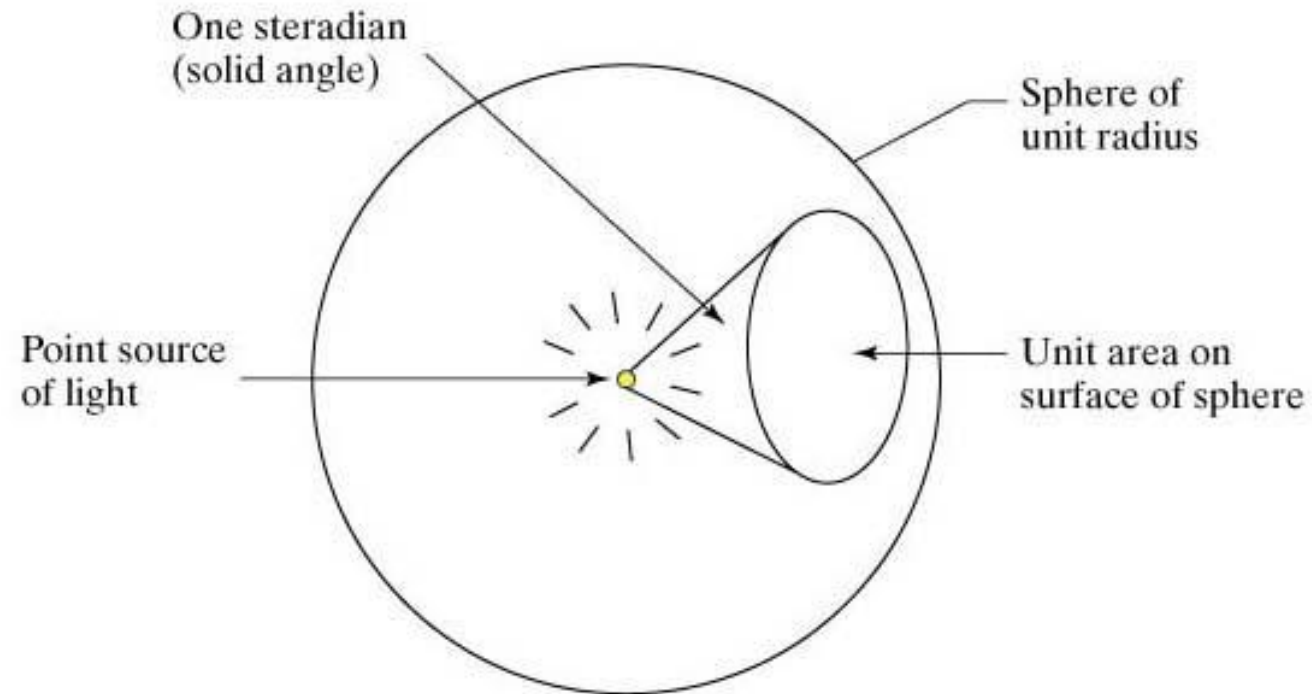
A decorative graphic on the left side of the slide, consisting of two parallel, wavy lines. The inner line is a light blue color, and the outer line is white. They follow a similar wavy path from the top left towards the bottom left.

# **PHYSICS OF LIGHT**

# THE PHYSICS OF LIGHT

- Luminous flux - rate at which light energy is emitted in all directions from a light source
  - It is the power of the light source
  - Units: lumen (lm)
- Luminous intensity - luminous flux emitted in a given direction
  - Units: candela (cd)

# POINT SOURCE OF LIGHT





# THE PHYSICS OF LIGHT

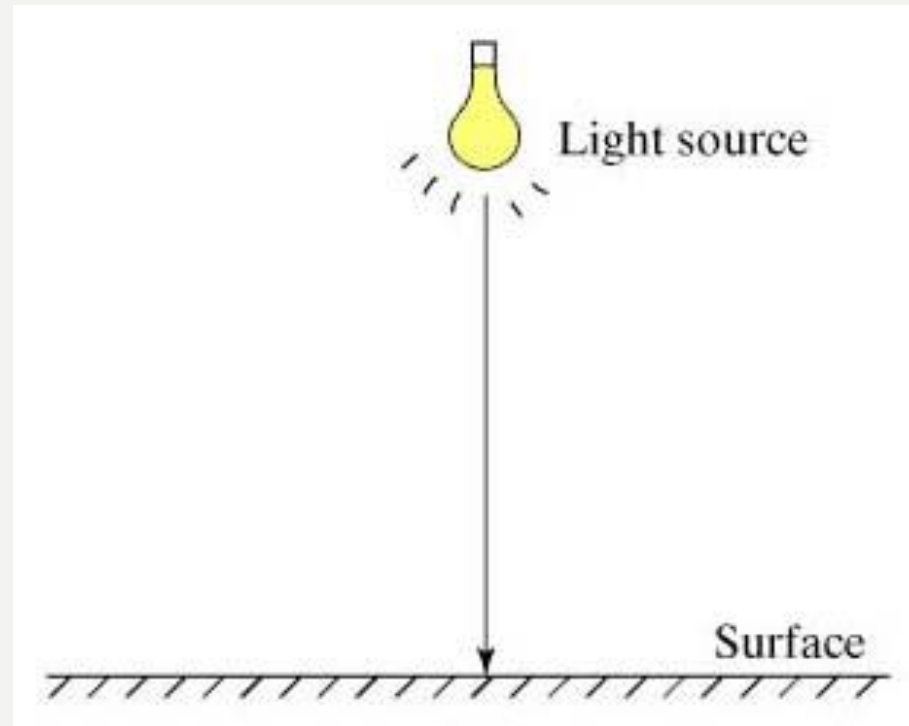
- Illuminance - luminous flux shining per unit area on a surface
  - Units: lux (lx) = 1 lumen per sq meter
- Luminance - amount of light reflected from a surface
  - Units: cd/sq m
  - Depends on
    - Illuminance - amount of light striking surface
    - Reflectance - depends on color and texture of surface

# ANGLE OF INCIDENCE $\theta = 0$

Illuminance decreases with distance from light source

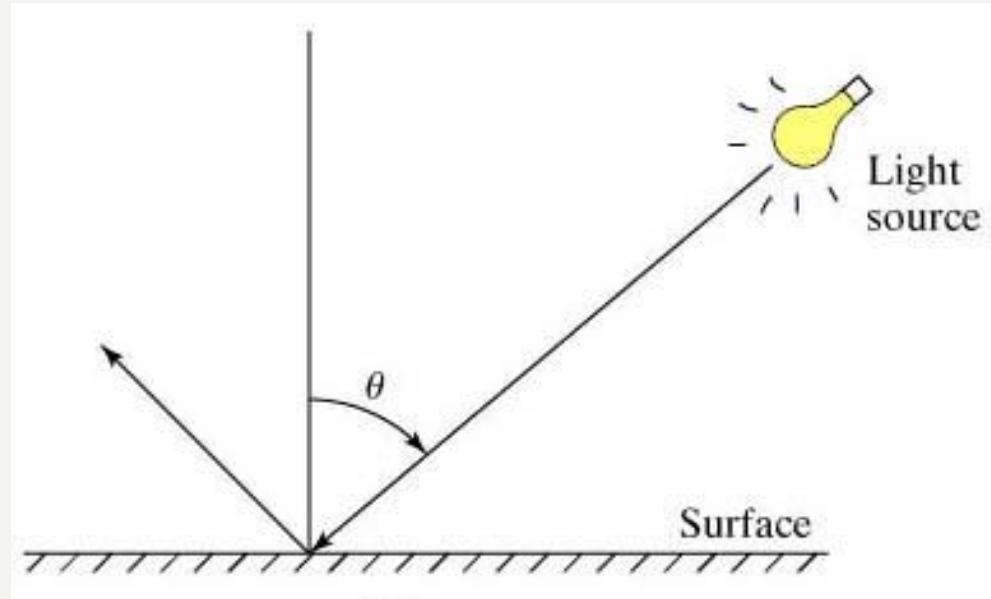
$$E = I / d^2$$

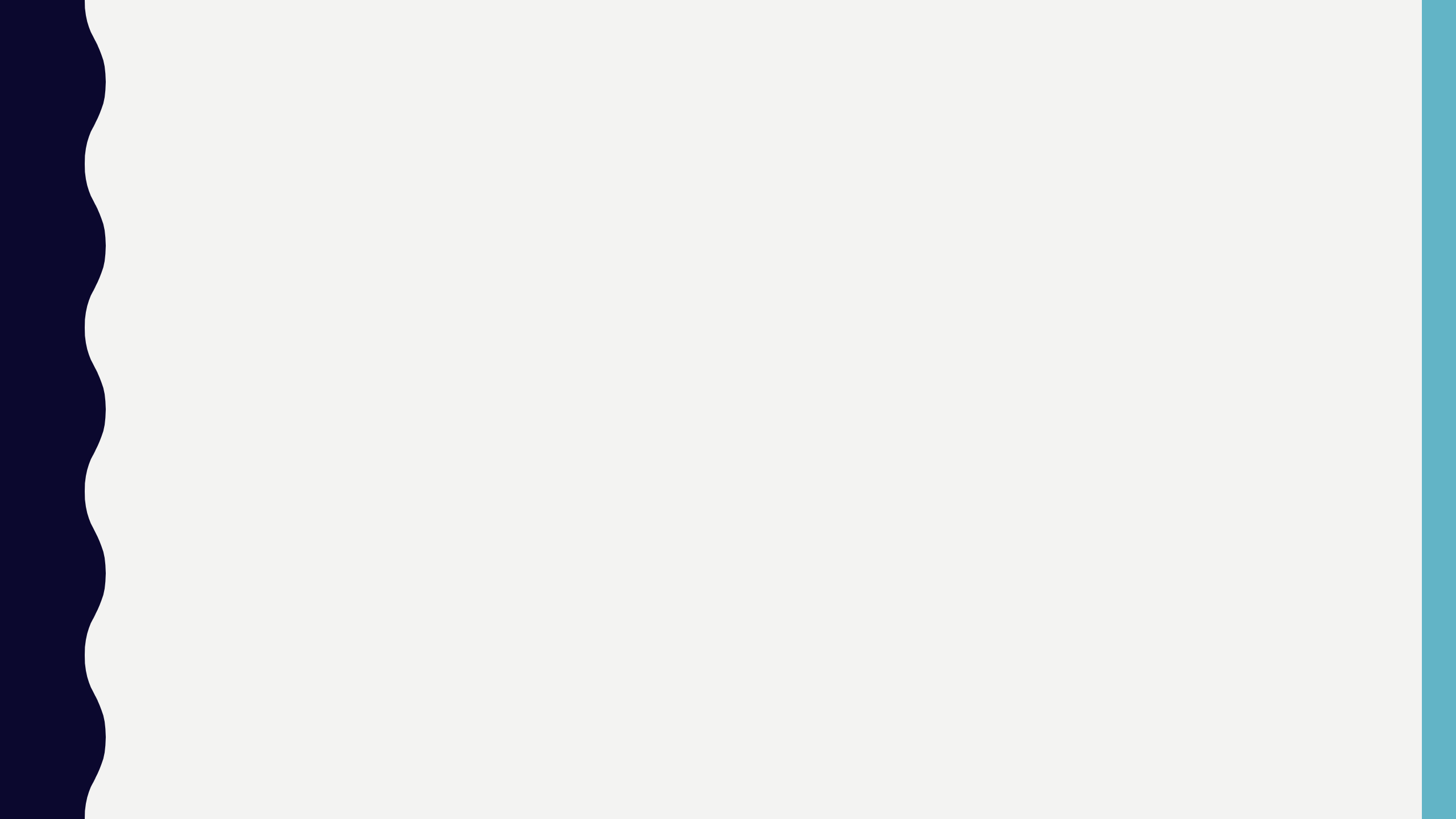
where  $E$  = illuminance,  $I$  = luminous intensity, and  $d$  = distance



# INCIDENT LIGHT IS AT ANGLE $\theta$

$$E = I \cos \theta / d^2$$





A decorative graphic on the left side of the slide consisting of two parallel, wavy lines. The inner line is a light blue color, and the outer line is white. They follow a similar undulating path from the top left towards the bottom left.

# **LECTURE CLOSING**

# DID YOU KNOW.....?????

- A 23-year-old Google employee lives in a truck in the company's parking lot.

When 23 year old Brandon started working as software engineer in Google, he opted out of settling into an overpriced San Francisco apartment. Instead, he moved into a 128-square-foot truck.



# IF YOU WERE.....????

- If you were a project manager at Maruti Suzuki, how would you take care of the environment to make it look more productive and effective.....???



# GRAFFITI

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***“There is no *I* in *TEAM*. But there is an *M* and an *E* and that spells *ME*!”***





# THANK YOU ...



PLEASE READ VISUAL ENVIRONMENT FROM  
RECOMMENDED REFERENCE BOOKS FOR A  
BETTER UNDERSTANDING OF NEXT  
LECTURE