Energy Efficient Lighting Design and other Technologies

IPRO 337 Team
Illinois Institute of Technology
The space

EXISTING SPACE

SOFTWARE RENDERED
Approach towards objectives

- Phase I: Product Research & Design of Space.
- Phase II: Lighting Design through Conventional Products.
- Phase III: Design and development of custom fixtures in an attempt to improve efficiency.
Phase I: Design of Space & Product Research

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- Research
  - Types of Lighting
  - Dimming Ballasts
  - Light Scoop

- Design
  - Floor plan
  - Software Simulation
Lighting Product Research
Lighting Research

- Incandescent Light bulbs
- Compact Fluorescent Light bulbs (CFL)
- Fluorescent Tube (T8, T5)
- LEDs
Incandescent Light Bulb

- Efficacy (lm/ W): 17
- Rated Life: 1000 hrs
- Cost ($): 0.2 - 2

100 W bulb gives out 1700 lumens
Compact Fluorescent Light Bulb

- Efficacy (lm/W): 50-70
- Rated Life: 6000–10,000 hrs
- Cost ($): 3-8

26 W bulb gives out 1700 lumens
Fluorescent Tube: T5, T8 (4ft.)

<table>
<thead>
<tr>
<th></th>
<th>T5</th>
<th>T8</th>
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<tbody>
<tr>
<td>Efficacy (lm/W)</td>
<td>104</td>
<td>93</td>
</tr>
<tr>
<td>Rated Life (hrs)</td>
<td>16,000-20,000</td>
<td>20,000-30,000</td>
</tr>
<tr>
<td>Cost ($)</td>
<td>9-12</td>
<td>2-5</td>
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32 W T8 gives out 2900 lumens
LEDs

- Efficacy (lm/ W): 30-(60) [150-200]
- Rated Life (hrs): 50,000–100,000
- Cost ($): 1-4
Dimming Ballast

- Dim: 100% to 5%
- Cost ($): 40
- Does not work next to windows
- More Research!
Simulation Software: Maxwell Render
Rendering with daylight only
Suggested Floor plan
Phase II: Design through available products
Further Enhancements

- Daylight sensors and auto dimming light controls.
- Occupancy Sensors.
- Addition of more storage capacity to existing battery backup.
Phase III: Creating new designs

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Fixture
- Choose from designs
- Build mock-up

Scoop
- Build mock-up
Fixture Designs
Fixture fabrication
Light Scoop Mock-Up
Workroom with only daylight
Workroom with light fixtures
Meeting room with only daylight
Meeting room with light fixtures
Lounge with only daylight
Lounge with light fixtures
Thank You.

Questions?