What are some of the dangers at Purdue?
What are some of the dangers at Purdue?

- Shock
- Hazardous Materials
- Burns
- Falls
- Fatigue
- Distractions
### Risk = Likelihood $\times$ Consequence

<table>
<thead>
<tr>
<th>Consequence Severity</th>
<th>Probability of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rare</td>
</tr>
<tr>
<td>Minor</td>
<td>Green</td>
</tr>
<tr>
<td>Low</td>
<td>Green</td>
</tr>
<tr>
<td>Moderate</td>
<td>Green</td>
</tr>
<tr>
<td>Significant</td>
<td>Green</td>
</tr>
<tr>
<td>Severe</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

- **Low Risk** (Green)
- **Medium Risk** (Yellow)
- **High Risk** (Red)

01/30/2019
OSHA

(Occupational Safety and Health Administration)

Right-To-Know
About OSHA

- Created in 1970 by the OSH Act
- Ensures safe working conditions for employees
- Covers:
  - Most private employers
  - Most public employers
  - The 50 States and U.S. Territories
What OSHA Does for You

Rights

- To be informed about the known health and physical hazards in your work area
- To be trained to use proper safety techniques and hygiene practices
What OSHA Does for You (Cont.)

Responsibilities

● To use the available information and to stay informed about the hazards in your work area
● To use the safety techniques and hygiene practices as a routine part of your daily activities
● To attend the training sessions conducted by your Designated Training Individual
Report a Concern

- Inform your designated training individual about accidents or hazardous situations in your work area.
- Formal complaints need to be submitted to:
  
  Indiana Department of Labor
  Indiana State Government Center South, Indianapolis, Indiana 46204-2287
  317.232.2655
Lab Safety
in ECE
ECE Lab Safety Guidelines

- No food and only sealed drinks
- Proper Clothing
  - Closed toe shoes
  - Appropriate pants
  - Natural fibers
- Proper PPE (Personal Protection Equipment)
  - Safety Glasses
  - Lab Coat

01/30/2019
Health Consequences

● No food and only sealed drinks
  ○ Ingested wires typically requires surgery to remove

● Proper Clothing
  ○ Natural fibers do not ignite as quickly as synthetic fibers
  ○ Long pants and closed toe shoes can stop falling pliers, scissors, or wire cutters from cutting your feet and legs.

● Other Considerations:
  ○ *Patience*
Electrical Safety

- Avoid becoming part of the circuit
- Frayed cords
- Broken sockets and plugs
- “Floating” devices
  - Reference thought to be ground, but isn’t
- Exploding Components
Safety Resources

Provided:

- Safety Glasses
- Lab Coat (where needed)
- Training with equipment
- SDS Sheets

  - [https://engineering.purdue.edu/Intranet/Groups/Schools/ECE/Admin/Safety/MSDS](https://engineering.purdue.edu/Intranet/Groups/Schools/ECE/Admin/Safety/MSDS)
SDS Sheets

Contains:

- Product Name
- Health Hazards
- Flammability
- Hazard Rating
- What to do in an Emergency
- Description of odor and appearance
- What PPE should be used
NFPA Rating Explanation Guide

HEALTH HAZARD

4 = Can be lethal
3 = Can cause serious or permanent injury
2 = Can cause temporary incapacitation or residual injury
1 = Can cause significant irritation
0 = No hazard

FLAMMABILITY HAZARD

4 = Will vaporize and readily burn at normal temperatures
3 = Can be ignited under almost all ambient temperatures
2 = Must be heated or high ambient temperature to burn
1 = Must be preheated before ignition can occur
0 = Will not burn

SPECIAL HAZARD

ALK = Alkaline
ACID = Acidic
COR = Corrosive
OX = Oxidizing
\(\alpha\) = Radioactive
\(\text{\ding{183}}\) = Reacts violently or explosively with water
\(\text{WOX}\) = Reacts violently or explosively with water and oxidizing

INSTABILITY HAZARD

4 = May explode at normal temperatures and pressures
3 = May explode at high temperature or shock
2 = Violent chemical change at high temperatures or pressures
1 = Normally stable. High temperatures make unstable
0 = Stable

This chart for reference only - For complete specifications consult the NFPA 704 Standard
Examples
ECE 477 EM Coil Gun

Specs:
- Speed at impact: 31.3 mph
- Time until impact: 1.43 s
- Energy at impact: ~1KJ

01/30/2019
Mishandling Batteries

- **Do Not**
  - Pierce
  - Shake
  - Crush
  - Stress

- **Hazards**
  - Fire
  - Chemical Burns
# Emergency Plan

<table>
<thead>
<tr>
<th>Emergency</th>
<th>What to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burns and Cuts</td>
<td>Water, bandage, etc</td>
</tr>
<tr>
<td>Fall, Drop, Crush</td>
<td>Call for help</td>
</tr>
<tr>
<td>Electric Shock</td>
<td>Call for help -- Be careful the victim is not still charged (if possible safely turn off power)</td>
</tr>
<tr>
<td>Seizures, etc</td>
<td>Call for help</td>
</tr>
<tr>
<td>Disorientation</td>
<td>Call for help, get an escort</td>
</tr>
<tr>
<td>Fights / Aggressive Behavior</td>
<td>Protect innocent if can be done safely, Call for help</td>
</tr>
</tbody>
</table>

Notify TA or Professor. If urgent, **CALL 911**, Direct Responders