

Student Design Hazard Assessment

A Hazard Assessment is designed to help students and project advisors recognize hazards associated with student projects at the early planning stages to find ways to minimize the chance of injury, loss, or harm while you are working on the project. This form is intended to be used for projects where the primary hazards are associated with engineering work (physical, mechanical, electrical, etc.). If projects involve the use of chemicals, radiological or biological materials, additional review and approval by respective safety committees will be required prior to starting work. Contact EH&S at ehslaboratory@ucr.edu.

Each student project must complete a Hazard Assessment form, even if the project is not expected to have any hazards. All required approvals must be obtained before proceeding with the project. It is important that all team members participate in the process, with close supervision of your advisor. To help ensure that hazards and risks associated with your project are not overlooked or underestimated, you are encouraged to contact any university staff (Lab Directors/Managers, EH&S, etc.) with relevant knowledge or experience for guidance.

The Hazard Assessment process usually involves these five steps below, with an example:

Step:	Example:
1. Identify the specific tasks that must be completed to reach your project goals	One of your project tasks involves testing a live electrical circuit
2. Determine if there are hazards associated with completing the tasks	On the form, you select the “Electrical parts and assemblies > 50V or high current”, under the Hazardous Conditions/Processes/Activities, Electrical Hazard section
3. If hazards exist, identify the risks connected with the hazards of each task. Ask yourself, what could go wrong? If you are not already familiar with the risks, do a quick internet search	After some research, you learn that there is potential of electrical shock from accidental contact with exposed live components
4. Develop a list of controls (things you can do) to eliminate the hazard or reduce the risks. Refer to <i>Hierarchy of Controls</i> on the next page	To minimize the risk identified above, you could: <ul style="list-style-type: none"> ○ De-energize and isolate the system <u>or</u> ○ Guard live components to prevent accidental contact
5. Create a safe working procedure. Describe how you will safely complete each task	You write a detailed procedure for testing a live electrical wire, that includes all the information from your hazard/ risk assessment and which controls you will use to reduce the risks
6. Submit your hazard assessment form for approval (see section below for details)	

Definitions:

A **Hazard** is something that has the potential to cause harm (injuries, accidents, or other undesirable effects). Hazards can be eliminated but not reduced. A hazard can be in the form of an Agent, Condition, Process or Activity.

Risk is the likelihood (probability) of a hazard causing harm to people, property or the environment. Risks associated with a hazard can be reduced. Put another way, *Risk = Hazard x Exposure*

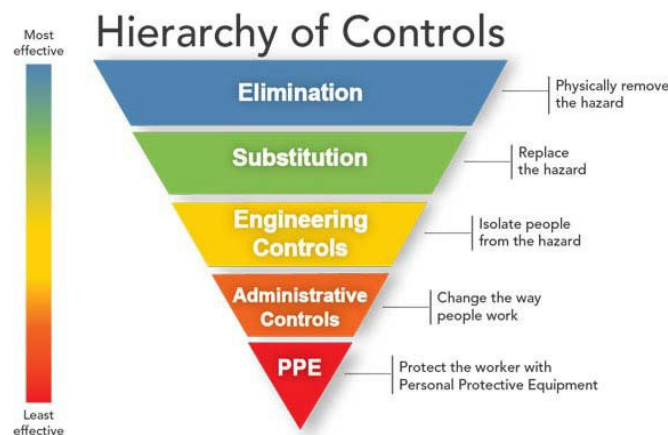
A **Hazard Assessment** is the process of identifying anything that can cause harm (hazardous agents, conditions, processes or activities).

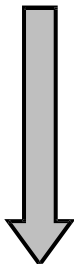
A **Risk Assessment** is the process of determining how great the chance is of harm occurring from a given hazard.

Hierarchy of Controls

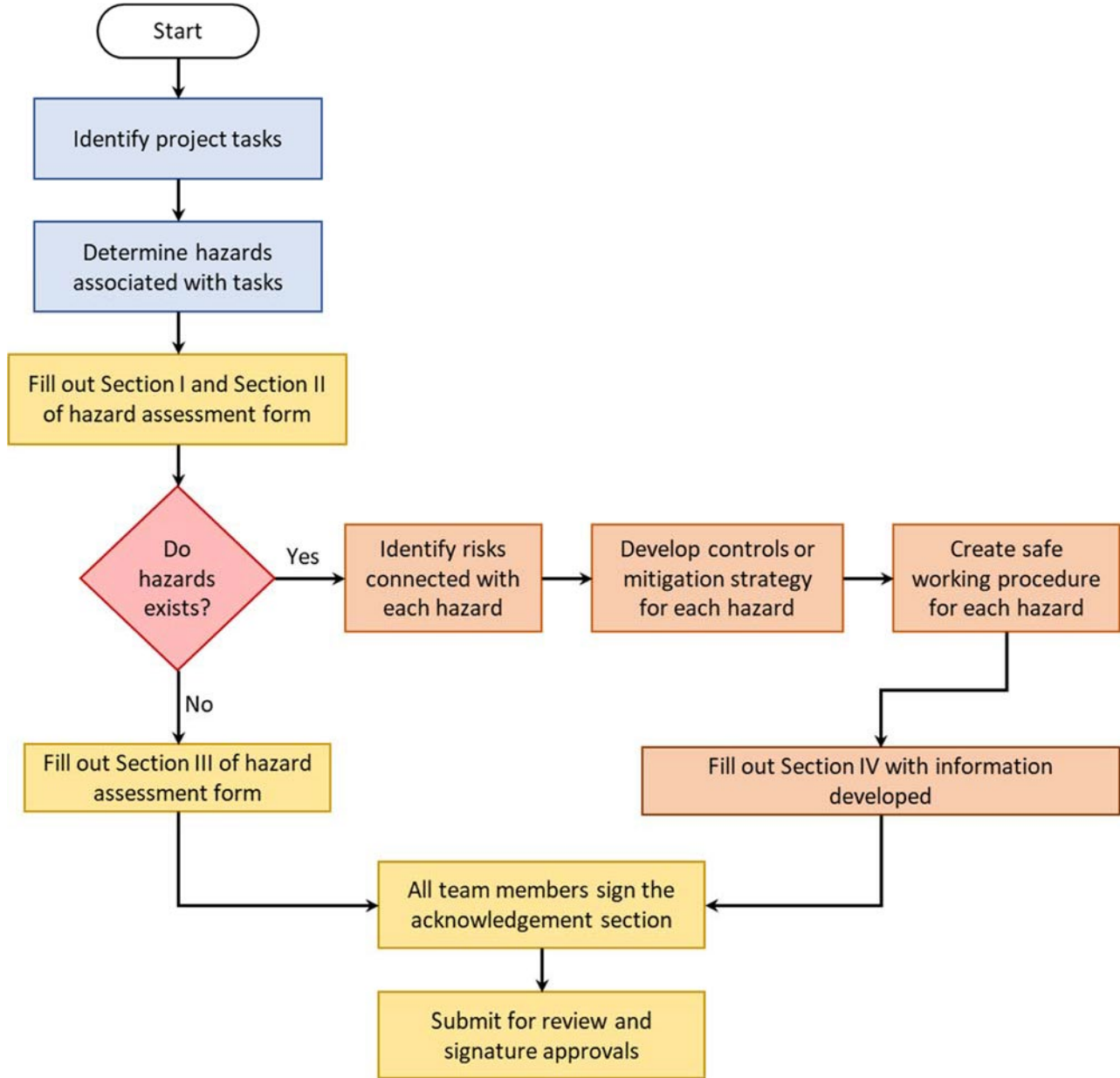
Unless the hazardous agent, condition, or activity is removed, hazards cannot be eliminated. However, risks from the hazard can be minimized by employing the proper control measures and safe work practices that will have been identified from completing a hazard assessment.

Some controls are more effective than others at eliminating hazards or reducing risk. Use the hierarchy of controls chart below to evaluate the controls measures you plan to use. Priority should be given to the most effective controls at the top of the hierarchy (elimination and substitution) and moving down, rather than start with the easiest one. While personal protective equipment (PPE) should always be used, it should be considered the last line of defense from potential hazards.



Hierarchy of Controls		Description and Examples
<p>Most Effective</p>  <p>Least Effective</p>	Eliminate the Hazard	Use alternative work procedures
	Substitution	Use less hazardous material or process
	Engineering Controls	Isolate people from hazard using ventilation, barriers, lock-out, safer equipment and tools, etc.
	Administrative Controls	Change the way people work: rules, warning signs, training, alarms, safe working procedures, etc.
	Personal Protective Equipment (PPE)	Appropriate clothing and footwear, safety glasses/goggles, lab coat, welding mask, face shield, ear plugs, etc. Best if used in combination with engineering controls

Hazard Assessment Form Process:



1. After completing the form, all team members must sign the acknowledgement section.
2. Your advisor and the department chair must approve this form prior to obtaining *formal* approvals from other university staff.
3. If your project involves the use of lab or shop space or equipment, the form must be routed to the appropriate lab/shop manager(s) for review and approval.
4. Your instructor, faculty advisor or department chair will make the determination whether EH&S approval is additionally required.
5. Depending on the scope of your project, the instructor, faculty advisor, department chair, lab/shop manager(s), *or* EH&S may request further approval from other relevant department or committees.

Student Design Hazard Assessment Form

This form is to be used for student projects where the primary hazards are associated with engineering work (physical, mechanical, electrical, etc.). If projects involve the use of chemicals, radiological or biological materials, additional review and approval by respective safety committees will be required prior to starting work. Contact EH&S at ehslaboratory@ucr.edu.

Complete this form and obtain all the required approvals (Instructor, Faculty Advisor, Department Chair, Laboratory Manager, EH&S, etc.) before proceeding with the project.

SECTION I: Project Description

Project Title:			
Project Team Members:			
Project Instructor/Faculty Advisor			
Name:	Department:	Phone:	Email:
Proposed Project Location(s) (Department, building, room#):			
Anticipated Dates of Project Duration:			

Summary of Project Objectives:

SECTION II: Hazard Checklist

Identify all the tasks that must be completed for your project. Carefully evaluate each task to determine if there are any associated hazards. After identifying the hazards of your project, you will be asked to assess the risk connected to each hazard and to identify control measures that will either eliminate the hazard or reduce the risk to an acceptable level. Safe work procedures for each step involving a known hazard will need to be developed.

HAZARDOUS CONDITIONS/PROCESSES/ACTIVITIES		
<p>Electrical Hazards</p> <ul style="list-style-type: none"> <input type="checkbox"/> Electrical parts and assemblies > 50V or high current <input type="checkbox"/> Batteries <input type="checkbox"/> Control Panels 	<p>Mechanical Hazards</p> <ul style="list-style-type: none"> <input type="checkbox"/> Power tools and equipment <input type="checkbox"/> Machine guarding/power transmission – gears, rotors, wheels, shafts, belt/chain drives, rotating parts, pinch points <input type="checkbox"/> Robotics <input type="checkbox"/> Sharp Objects <input type="checkbox"/> Stored Energy (springs, gravity, pneumatic, hydraulic, pressure) 	<p>Physical Hazards</p> <ul style="list-style-type: none"> <input type="checkbox"/> Extreme temps (high temp fluids: water > 160 °F, steam, hot surfaces > 140 °F, cryogenic fluids) <input type="checkbox"/> Material handling of heavy objects <input type="checkbox"/> Elevated heights (scaffolding, ladders, roofs, lifts, etc.) <input type="checkbox"/> Overhead falling objects (cranes, hoists, drones, projectiles, etc.) <input type="checkbox"/> Confined Spaces <input type="checkbox"/> Airborne Dusts <input type="checkbox"/> Bonding / Grounding <input type="checkbox"/> Electrostatic Discharge

Reaction Hazards	Hazardous Processes	Other Hazards
<input type="checkbox"/> Explosive <input type="checkbox"/> Exothermic, with potential for fire, excessive heat, or runaway reaction <input type="checkbox"/> Endothermic, with potential for freezing solvents decreased solubility or heterogeneous mixtures <input type="checkbox"/> Gases produced <input type="checkbox"/> Hazardous reaction intermediates/products <input type="checkbox"/> Hazardous side reactions	<input type="checkbox"/> Generation of air contaminants (gases, aerosols, or particulates) <input type="checkbox"/> Heating chemicals <input type="checkbox"/> Large mass or volume <input type="checkbox"/> Pressure > Atmospheric <input type="checkbox"/> Pressure < Atmospheric <input type="checkbox"/> Scale-up of reaction <input type="checkbox"/> Metal fabrication (soldering, welding, cutting, drilling, etc.) <input type="checkbox"/> Construction/Assembly, etc.	<input type="checkbox"/> Noise > 80 dBA <input type="checkbox"/> Vehicle traffic <input type="checkbox"/> Hazardous waste generation <input type="checkbox"/> Other (list):
<input type="checkbox"/> Check here if project will not involve any hazardous conditions, processes, or activities		

Hazard Checklist (continued)

HAZARDOUS MATERIALS			
Physical Hazards of Chemicals	Health Hazards of Chemicals	Radiological Hazards	Biohazards
<input type="checkbox"/> Compressed Gases	<input type="checkbox"/> Acute Toxicity	<input type="checkbox"/> Lasers	<input type="checkbox"/> BSL-2 Biological Agents
<input type="checkbox"/> Cryogenics	<input type="checkbox"/> Carcinogens	<input type="checkbox"/> Magnetic Fields (e.g. NMR)	<input type="checkbox"/> rDNA
<input type="checkbox"/> Explosives	<input type="checkbox"/> Nanomaterials	<input type="checkbox"/> RF/Microwaves	<input type="checkbox"/> Human Cells, Blood, BBP
<input type="checkbox"/> Flammables	<input type="checkbox"/> Reproductive Toxins	<input type="checkbox"/> UV Lamps	<input type="checkbox"/> Animal Work
<input type="checkbox"/> Oxidizers	<input type="checkbox"/> Respiratory or Skin Sensitization	<input type="checkbox"/> X-ray	
<input type="checkbox"/> Peroxides or Peroxide Formers	<input type="checkbox"/> Simple Asphyxiant	<input type="checkbox"/> Radiation Producing Machines	
<input type="checkbox"/> Pyrophorics	<input type="checkbox"/> Skin Corrosion/Irritation		<input type="checkbox"/> Other (List):
<input type="checkbox"/> Water Reactives	<input type="checkbox"/> Hazards Not Otherwise Classified		
<p>If any hazards are selected, additional review and approval by respective safety committees are required prior to starting work. Contact EH&S at ehslaboratory@ucr.edu for additional guidance.</p>			
<input type="checkbox"/> Check here if project will not involve any hazardous agents			

SECTION III: Projects with No Hazards

IF your project meets all these conditions:

- No hazardous condition processes, or activities
- No hazardous agents
- Will not use any laboratory or shop space

You can stop at this section. Acknowledge below and obtain the approvals from 1) Instructor/Faculty Advisor, and 2) Department Chair.

If your project involves hazardous processes, activities, conditions or agents are, please continue to SECTION IV to complete the rest of the form.

ACKNOWLEDGEMENT (for projects with no hazards)		
By signing, I verify that the project will not involve any hazards listed in Section II.		
Name	Signature	Date
APPROVALS (for projects with no hazards)		
This document must be reviewed and approved by the people below before any project work can begin. A copy of the approved document must be kept where the work is being conducted		
Instructor/Faculty Advisor <small>(required)</small>		
Name:		
Department:	Signature	Date
Department Chair <small>(required)</small>		
Name	Signature	Date

SECTION IV: Hazard Assessment and Control

Description of Potential Hazards

Provide a summary of the procedure and describe the risks associated with each hazard that you have identified above or on the previous page. Use one box below per hazard. You may add supplemental pages if needed. Define the hazard control measures that will be employed to minimize the risks based on the hierarchy of controls (elimination, substitution, engineering controls, administrative controls, PPE), and then describe specific control measures you will use (e.g. work on system de-energized, receive hazard specific training, shield hot surfaces, guard pinch points, relieve stored energy, wear protective equipment, use less hazardous chemical, etc.). Refer to “Hierarchy of Controls” in the instructions sheet for more information to decide which hazard controls measures are most appropriate. Ensure a detailed [standard operating procedure \(SOP\)](#) is completed, reviewed and signed for each task/process.

Hazardous Activity, Process, Condition, or Agent (identified from previous page):
Summary of Procedure or Tasks:
Describe Hazards (why is the procedure hazardous or what can go wrong – what is the risk):
Hazard Control Measures (what you will do to eliminate the hazard or minimize risks):

Hazardous Activity, Process, Condition, or Agent (identified from previous page):
Summary of Procedure or Tasks:
Describe Hazards (why is the procedure hazardous or what can go wrong – what is the risk):
Hazard Control Measures (what you will do to eliminate the hazard or minimize risks):

Hazardous Activity, Process, Condition, or Agent (identified from previous page):
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Summary of Procedure or Tasks:

Describe Hazards (why is the procedure hazardous or what can go wrong – what is the risk):

Hazard Control Measures (what you will do to eliminate the hazard or minimize risks):

Hazardous Activity, Process, Condition, or Agent (identified from previous page):

Summary of Procedure or Tasks:

Describe Hazards (why is the procedure hazardous or what can go wrong – what is the risk):

Hazard Control Measures (what you will do to eliminate the hazard or minimize risks):

Hazardous Activity, Process, Condition, or Agent (identified from previous page):

Summary of Procedure or Tasks:

Describe Hazards (why is the procedure hazardous or what can go wrong – what is the risk):

Hazard Control Measures (what you will do to eliminate the hazard or minimize risks):

Hazardous Activity, Process, Condition, or Agent (identified from previous page):

Summary of Procedure or Tasks:

Describe Hazards (why is the procedure hazardous or what can go wrong – what is the risk):

Hazard Control Measures (what you will do to eliminate the hazard or minimize risks):

Hazardous Activity, Process, Condition, or Agent (identified from previous page):

Summary of Procedure or Tasks:

Describe Hazards (why is the procedure hazardous or what can go wrong – what is the risk):

Hazard Control Measures (what you will do to eliminate the hazard or minimize risks):

Hazardous Activity, Process, Condition, or Agent (identified from previous page):

Summary of Procedure or Tasks:

Describe Hazards (why is the procedure hazardous or what can go wrong – what is the risk):

Hazard Control Measures (what you will do to eliminate the hazard or minimize risks):

SAFETY EQUIPMENT and PPE

Select the appropriate PPE and safety supplies you will need for the project (Check all that apply)

- Appropriate street clothing (long pants, closed-toed shoes)
- Gloves; indicate type: _____
- Safety glasses/ goggles
- Face shield and goggles
- Lab coat
- Hearing protection
- Fire extinguisher
- Eyewash/safety shower
- Spill kit
- Other (list):

TRAINING REQUIREMENTS

Identify the appropriate training (check all that apply)

- Laboratory Safety Fundamentals
- Hazardous Materials and Waste Management
- Project Specific Training – contact Instructor/Faculty Advisor
- Other (describe below):

EMERGENCY PROCEDURES

Life-threatening emergencies (fire, explosion, hazardous material spill/release, hazardous gas leak, etc.)

1. Call **911** or **UCPD: 951-827-5222**
2. Alert people in the vicinity and if necessary, activate the local alarm systems
3. Evacuate to your emergency assembly area (EAA). Fill in your EAA here: _____
4. Remain nearby to advise emergency responders

For medical emergencies:

1. Stay with the individual if it is safe to do so. Do not move the individual unless absolutely necessary
2. Call 911 or UCPD
3. Administer first aid if you are trained to do so

If person received an electrical shock:

1. Do not touch the person
2. Shut off power and/or rescue the person with non-conductive object IF it is safe to approach
3. Call 911 or UCPD
4. Administer CPR or AED if trained to do so

If person exposed to hazardous materials:

1. Flush contamination from eyes/skin using the nearest emergency eyewash/shower for a least 15 minutes. Remove any contaminated clothing
2. Call 911 or UCPD

For building maintenance emergencies (e.g. power outages, plumbing leaks): call Facilities at 951-827-4214

REPORT all injuries and incidents (including near misses) to instructor/faculty advisor and EH&S at (951) 827-5528 or at <https://ehs.ucr.edu/report>

Project work outside of UCR campus

Generally, all project work must be performed at UCR campus. However, there may be few cases where work cannot be completed on campus (e.g. competition venue outside of UCR, no appropriate campus location to field-test). These exceptions must be described in the hazard assessment section above. Specific location(s) and their scope of work must have approval from the instructor/faculty advisor. Additional approvals may be required.

Check the appropriate project location scope:

- All project work will be performed on UCR campus
- All project work cannot be completed on UCR campus. Provide more details below:

List offsite location(s) and provide description:

Describe supervision arrangements and specific emergency procedures for each offsite location:

ACKNOWLEDGEMENT

By signing, I verify that:

- 1) I am aware of the hazards and risks of all the tasks associated with the project
- 2) I have received, or will receive all the necessary safety training and/or have read the safety manual and safety data sheets (SDSs) relevant to the project before performing any hazardous tasks
- 3) I will follow all required safety precautions while working on this project, including but not limited to use of engineering controls, following safe work practices, and wearing appropriate personal protective equipment, as well as all emergency procedures

Name of Project Team Member	Signature	Date

APPROVALS

This document must be reviewed and approved, in the order listed below, before any project work can begin. A copy of the approved document must be kept where the work is being conducted

1. Instructor/Faculty Advisor (required)

Name:		
Department:	Signature	Date
2. Department Chair (required)		
Name	Signature	Date
3. Laboratory Director/Manager (required if project involves use of lab or shop space)		
Name	Signature	Date
4. EH&S (required as determined by instructor, faculty advisor, department chair, or lab director/manager)		
Name	Signature	Date
5. Other (if requested by instructor, faculty advisor, department chair, lab director/manager, or EH&S)		
Name	Signature	Date