IMRC Safety Policy & Procedures

I.M.R.C. Center- Department of Intermedia

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This Lab Safety Policies and Procedures document explains the fundamental policies, procedures and safe work practices that all lab users must follow. All lab users must be provided a copy of these policies and procedures, review them, understand them and have an opportunity to ask questions about the content of this document. Once the review is complete, the user and lab manager must sign the form signifying that the fundamental lab user safety training and orientation has been completed. This training must be refreshed annually.

Lab / Studio Safety Coordinator Responsibilities

Lab / Studio Safety Coordinators should have sufficient knowledge of departmental operations, lab/studio activities and University procedures to successfully fulfill their roles and responsibilities. Coordinators will need to collaborate with Department Chairs, Faculty, Staff, Students, and Safety & Environmental Management (SEM) to effectively fulfill key tasks.

These responsibilities include:

- Serve as the primary SEM contact for departmental labs and studios. When appropriate, the Department Director and/or the Faculty Supervisor will be copied on correspondence and communication.
- Coordinate SEM inspections of designated work areas or processes. These inspections may include comprehensive Injury and Illness Prevention Program audits, annual lab, foundry or studio inspections, hazard evaluations of designated processes and/or equipment, and where appropriate, monthly hazardous materials storage area inspections.
- Coordinate and/or perform quarterly self-inspections of labs, studios, the foundry and other work areas where hazardous materials or equipment are used.
- Maintain inspection reports, including tracking of follow up actions and documentation of corrective actions. Report deficiencies and issues that require further assistance to SEM and the Department Director.
- Note when equipment, engineering controls or facility items such as rigging equipment, ventilation systems, emergency eyewash units, lighting, tools, etc. need maintenance or repair. Coordinate and document regularly scheduled maintenance checks of rigging equipment systems. Coordinate work orders and work with the administrative staff to ensure facility and safety devices are in good working order.
- Coordinate and/or provide training for new employees and students before they begin working in lab, foundry and studio areas. Coordinate and provide task specific training as appropriate (aerial lifts, ladders, table saw, drill press, etc.).
- Maintain training documentation and records, including new employee and task / equipment specific training, for designated lab, foundry and studio facilities.

- Coordinate access and security procedures for lab, studio and foundry facilities, including use of designated equipment, based on appropriate safety training.
- Ensure the availability and proper use of Personal Protective Equipment such as safety glasses, face shields, gloves (cut resistant and chemical resistant), respirators, aprons, hard hats and hearing protection devices.
- Ensure proper attire is worn in labs and studio areas. Long pants, close toe shoes and hair restraints should be worn in the Fabrication and CNC areas at all times. Torn and loose clothing should not be worn in the labs or work areas.
- Maintain departmental lab, studio and foundry safety postings and warning signs.

TYPES OF LAB USERS

- ***Authorized person*** - an individual (either trainee or competent user) who after basic safety, basic lab safety, and relevant individual tool training is authorized to operate specific equipment by the lab supervisor.
- ***Trainee*** – is an authorized user that requires supervision in the operation of machine lab equipment.
- ***Competent user*** - is an authorized user that may, depending upon the operation being carried out, work without supervision and or without monitoring (but not alone). This person must have passed all online safety trainings.
- ***Monitor*** – this is a competently trained person who is authorized to stop hazardous operations.

It is highly important that you are aware of what your status and others status are so that we can all hold each other accountable for the safe operation and smooth operation of the educational facility. I you think that someone might not be authorized to use certain equipment then please ask them if they are authorized and if no then find someone who can help them.

PHASES OF SAFETY CERTIFICATION

Because of the ***Yale incident*** all Universities have adopted a new ***Phased Safety Certification Program***. This program consists of 3 phases of certification and places an importance on a users ability to understand the level of danger that each class of machines contains.

Phase 1 trainings: (*required)

LEVEL 1: (Light Green)
General Safety & Hand tools (manual & power)*

2D Printing level 1 xerox & 4800
Lasercutting level 1 universal
3D Printing level 1: Makerbot
Electronics lab: soldering (required), power supplies & oscilloscopes (optional)
Vacuum Forming
LEVEL 2: (Dark Green)
Lasercutting level 2: Logilase
2D Printing level 2: 9890 & vinyl cutter
3D Printing level 2: Objet & Zcorp

Phase 2 trainings:

(must have completed phase 1 general safety & hand tools training first!) (Orange)
Wood shop - Large Power tools (table saw, miter, band, planar, drill press, sheer brake roll etc.)

Phase 3 trainings:

(must have completed phase 1 general hand tools and phase 2 training first!) (Red)
Shop Saber
CNC

Individual lab managers or supervisors are authorized to apply rules/procedures that are more stringent than those indicated below. No established rules/procedure may be less stringent than those detailed in this document. The lab rules must be conspicuously posted in the area.

IMRC LABORATORY POLICIES

1. Before being authorized to operate equipment (whether supervised or unsupervised), a prospective user must undergo and complete Phase 1, Basic Safety Training, Machine Lab General Safety (general) and specific equipment safety training (initially & with annual refreshers).
2. Users being trained require written authorization by the lab manager/supervisor to operate under supervision specific equipment.
3. Competent users require written authorization by the lab manger/supervisor to operate specific equipment without direct supervision while carrying out routine tasks. (Authorized competent users of industrial category equipment will be subject to monitoring by lab managers/supervisors).
4. Non-routine tasks must undergo a hazard analysis and be approved by the lab manager/supervisor prior to commencement of the operation.

5. The lab supervisor and faculty have full authority of the lab and its safe use, including the responsibility, authority and obligation to prohibit lab or tool access for the health and safety of users, others in the lab, or university property and equipment.
6. Equipment that has been tagged out of service or equipment that is damaged or does not appear to be operating normally must not be used.
7. No loose clothing may be worn when operating equipment this includes ties, scarves and loose sleeves. Open toed shoes, shorts, or skirts are also prohibited.
8. Long hair, including beards, must be pulled back and secured and contained.
9. Jewelry that may cause a hazard when operating equipment may not be worn; this includes rings, necklaces, bracelets and watches.
10. Aisles, exits and emergency equipment must be kept clear at all times.
11. Safety Glasses/Face Shields must be worn at all times in the lab when work is being done. Some operations and equipment may require additional PPE.
12. All guards and shields must be secured and in place prior to operating the equipment.
13. Compressed air must not be used to clean skin or clothing.
14. All equipment and safety issues or concerns must be reported immediately to the lab supervisor or monitor.
15. Working alone [The Buddy System]:
    - Undergraduates and users under training must not work alone; and they must work during the official open hours of the lab. The lab supervisor must be present at all times.
    - Users of the lab & industrial machines category (Phases 2 & 3) must not work alone; a monitor must be present at all times.
    - The normal operating procedure is that there should be at least two people present in the lab area when machine tools are being operated.
    - If working alone is required a written job hazard analysis must be carried out and standard operating procedures put into effect that will eliminate or reduce the hazards associated with working alone.
16. Access to machine tools will be controlled to prevent out of hours operation of equipment.
17. All equipment must be maintained and used in accordance with manufacturer's recommendations and any statutory requirements. Equipment cannot be rigged to operate in a way that it was not intended.
18. No horseplay
19. No food, beverages, or any type of tobacco are allowed in the labs.
20. Stay alert! Watch what you are doing, and use common sense when operating a power tool. Do not use tool while tired or under the influence of drugs, alcohol, or powerful medication. A moment of inattention while operating power tools may result in serious personal injury. Do not disturb someone working, make sure they know your there.

PERSONAL PROTECTIVE EQUIPMENT

- ***Safety glasses*** must be worn AT ALL TIMES while using tools and be on before entering the fabrication lab. Your normal glasses are not safety glasses.
- ***Face shields*** should be worn while grinding and are available for other operations.
- ***Hearing protection*** is also available and should be worn when decibels are above safe levels.
- Dust mask, Steel toe shoes, or hearing protection must be used for appropriate conditions.

TOOLS

1. Do not operate any machinery or equipment without prior authorization from the Lab Supervisor.
2. Authorization includes specific training by IMRC staff about potential hazards, the proper operation of equipment, and the use of protective devices. The worker must also show proficiency on a piece of equipment prior to use and sign a training acknowledgment form.
3. Check with the Lab Supervisor for training schedules/procedures.
4. Follow tool specific rules for additional safety equipment (like gloves, or dust masks), or add additional safety equipment for your personal comfort.

HOUSEKEEPING

1. Keep the lab work area clean, clear of debris, and well lit. Cluttered benches and dark areas invite accidents, and cluttering the labs with your mess is rude to the other users.
2. Do not allow hoses or cords to become a tripping hazard.
3. Place absorbent towels or sawdust on all spills immediately to prevent slipping hazards.
4. Aisles, exits, and access to emergency equipment must be kept clear at all times.
5. Compressed air must not be used to clean skin or clothing. Do not clean chips from the surface of machines with compressed air or with hands; a brush or hook should be used.
6. Where general cleaning of machines and equipment by compressed air is considered necessary, the outlet pressure shall be no more than 10 p.s.i.
7. Provide ample workspace around each machine. Aisles need to be of sufficient width to permit the uncrowded and safe passing of personnel, scenery, carts, and/or other materials.
8. Everyone shares in clean up duty. Do not leave before clean up. After you have returned your tools to ***exactly*** where they belong, cleaned your machine and your area, ask the

supervisor for further clean up assignments.

9. Store projects and equipment when you finish each day in your studio are in the open space of room 118. Do not store your projects in the labs unless authorized by the lab supervisor.
10. The scene lab should be picked up and swept BEFORE you leave, unless you have an agreement with another lab user or the lab supervisor.

USE AND CARE OF TOOLS

1. Any damaged equipment ***must*** be reported to the Technician
2. Use a push-stick to guide material through saws or routers where there is the possibility of the operator's fingers coming in contact with blades.
3. Know how to turn off a machine before you turn it on.
4. Do not disturb or talk to persons operating power machinery.
5. Do not allow yourself to be distracted by others talking to you or by your cell phone. Cell phones, mp3 players, and other ***personal electronic devices must not be used when working at any machine***. Loud music that distracts or affects communication is prohibited.
6. All guards and shields must be secured and in place prior to operating equipment.
7. Always stop the machine before making measurements or adjustments.
8. ***Do not place hand tools on machines***. Keep them in their assigned location or on a nearby bench.
9. Use clamps or other practical ways to secure and support the work piece to a stable platform. Holding the work by hand or against your body is unstable and may lead to loss of control.
10. Remove chuck keys immediately after using. Do not turn on machine with chuck key installed in chuck. A wrench or a key that is left attached to a rotating part of the tool may result in personal injury.
11. ***Do not force a tool***. Use the correct tool for your application. The correct tool will do the job better and safer at the rate for which it is designed.
12. Do not use tool if the switch does not turn it on or off. Any tool that cannot be controlled with the switch is dangerous and must be repaired.
13. ***Disconnect the plug from the power source before making any adjustments***, changing accessories, or storing the tool. Such preventive safety measures reduce the risk of starting the tool accidentally.
14. Maintain tools with care. Keep cutting tools sharp and clean. Properly maintained tools with sharp cutting edge are less likely to bind and are easier to control. Do not use a damaged tool. Tag damaged tools "Do not use" and give them to the Lab Supervisor or a lab supervisor.
15. Check for misalignment or binding of moving parts, breakage of parts, and any

other condition that may affect the tool's operation. If damaged, give the tool to your supervisor. Many accidents are caused by poorly maintained tools.

CLOTHING/ATTIRE

1. ***Wear appropriate clothing*** when working in the lab. During construction or painting, nice clothing can be stained or sometimes torn. If you don't want it to get ruined, don't wear it here.
2. ***Do not wear overly loose or tight (restrictive) clothing*** including ties, scarves, jewelry, baggy clothes, excessive fringe, loose sleeves, or clothing with drawstrings that may be caught in a machine.
3. ***Open toed shoes or sandals, shorts, short pants, or skirts are prohibited.***
4. Long hair must be pulled back, secured, and contained; long beards must also be contained.

ELECTRICAL SAFETY

1. Grounded tools must be plugged into an outlet properly installed and grounded in accordance with all codes and ordinances. ***Never remove the grounding prong or modify the plug in any way***. If the tools should electrically malfunction or break down, grounding provides a low resistance path to carry electricity away from the user.
2. Double Insulated tools are equipped with a polarized plug (one blade is wider than the other).This plug will fit in a polarized outlet only one way. If the plug does not fit fully in the outlet, reverse the plug. If it still does not fit, contact your supervisor. Do not change the plug in any way. Double insulation eliminates the need for the three wire grounded power cord and grounded power supply system.
3. Do not expose power tools to rain or wet conditions. Water entering a power tool will increase the risk of electric shock.
4. ***Do not abuse the cord***. Never use the cord to carry the tools or pull the plug from an outlet. Keep cord away from heat, oil, sharp edges or moving parts. Replace damaged cords immediately. Damaged cords increase the risk of electric shock.
5. When operating a power tool outside, use an outdoor extension cord marked "W-A" or "W". Plug into a GFCI outlet or use a GFCI equipped extension cord. These cords are rated for outdoor use and reduce the risk of electric shock.

IMRC EMERGENCY PROCEDURES

1. Know what the ***Safety Data Sheets*** (SDS) are and where they are kept.
2. In case of fire, exit the building verbally warning others as you go. Congregate at

designated rally points. Keep flammables in cabinet labeled “flammables”.

3. ***Report all injuries, no matter how slight, to the Lab Supervisor***. The first aid kit is available next to the sink.
4. Report all problems with machines to the Lab Supervisor so the machines can be locked out and tagged out if necessary. Repairs can’t be performed if we don’t know they need to be done.
5. Be familiar with the lab’s Lock-out-tag-out procedures and don’t tamper with a machine that has been locked out.
6. Damaged equipment, or equipment that does not appear to be operating normally, must not be used. Tag it as out of service and report the issue to Lab Supervisor or a supervisor
7. Immediately report all problems or concerns to the Lab Supervisor or a supervisor.
8. ***The lab supervisor and the technicians have full authority*** over the lab and its safe use, including the responsibility, authority, and obligation to prohibit lab or tool access for the safety of an individual, others in the lab, or the equipment.
9. Avoid accidental starting. ***Be sure switch is off before plugging in.*** Carrying tools with your finger on the switch or plugging in tools with the switch on invites accidents.
10. Do not overreach. Keep proper footing and balance at all times. Proper footing and balance enables better control of the tool in unexpected situations.

AFTER HOURS WORK

If you need to work in the IMRC Labs outside of normal business hours (10a.m. through 7 p.m., Monday through Friday), please request permission from the Lab Supervisor.

List of Approved Emergency Procedures

FIRE

ONLY FIGHT A FIRE IF…

- You are authorized and trained to do so.
- Everyone has left or is leaving the building, and that the fire department has been called.
- The fire is contained to a small area and that it is not spreading.
- You have an unobstructed escape route if things go badly.
- The extinguisher is the right type for the fire.
- You have been trained by the University in the hands-on use of an extinguisher within the last three years.

NEVER FIGHT A FIRE IF…

- You don't know what is burning therefore, you might not know what type of extinguisher to use.
- You don't have the right type or large enough fire extinguisher.
- The fire is producing large amounts of smoke. Burning of synthetic materials such as the nylon in carpeting or foam padding in furniture can produce highly toxic gases such as hydrogen cyanide, acrolein, and ammonia in addition to carbon monoxide. These gases can be fatal in very small amounts.
- Your instincts tell you not to or you are uncomfortable with the situation for any reason.
- You don't have an exit or means of escape at your back. In case the extinguisher malfunctions, or something unexpected happens you don't want to become trapped. Always keep an exit at your back.

Personal Injury Emergency Procedures

In the event that:

1. You are injured or come upon an injured person.
2. Encounter suspected blood or other bodily fluids. You shall:
   - Inform the Lab Supervisor, or IMRC Faculty.
   - Call 911 (Cell phone call 581-4040) and inform them what has happened.
   - If the victim is other than you, administer first aid only if you are currently certified and are using the proper personal protective equipment.

- If you see suspected blood or other bodily fluids and no victim, call Public Safety at 911 (Cell phone call 581-4040) and inform the dispatcher. Keep people away from the suspected bodily fluid (DO NOT attempt a cleanup on your own).
- The injured person should file an INCIDENT REPORT Workers' Compensation: Employee Injuries & Illnesses (UM system form).

Prevention/Follow-up

The lab supervisor will conduct periodic safety audits and develop a corrective plan to reduce the risk of hazards within the workspaces. Once an emergency situation has been mitigated, an incident investigation will be completed, and corrective measures will be implemented to prevent future recurrence of the problem.

Implementation and Maintenance

This plan will be reviewed, trained, and exercised when the plan is first implemented, whenever a new user is being initiated, when changes necessitate, or at least once a year. The training will consist of providing a copy of the Emergency Action Plan, explaining procedures, walking through an evacuation, and answering any questions the lab user has.

Annual evacuation drills may also be conducted. The person responsible for updating and training this Emergency Action Plan is the lab supervisor.

Further Information on Emergency Actions

Call University of Maine Department of Safety & Environmental Management at 581- 4055.

Classroom Announcement

(This announcement needs to be made at the first class meeting of each semester.)

"If you hear the Fire/Evacuation alarm sound (Buzzer w/ Strobe) you are to immediately evacuate the labs. If you are Fire Extinguisher trained, extinguish the flames and then shut off equipment in rooms 115 & 116 by pressing the big red emergency shut off button found on the wall.

Your primary evacuation route is to the nearest fire exit found on either side of the Fabrication Lab (Rooms 115-117). If that route is unusable your secondary route is through the common space to the front or rear door. You are to quietly and swiftly evacuate to the following rally point *(behind the Stewart Commons on the Hilltop Road)* and in inclement weather go to *(the Rec Center)* and await further instructions. DO NOT reenter the building until it is declared safe by the authorities. If any of you need accommodations to safely evacuate or detect the alarm, please notify the lab supervisor at (Gene's Info) TEL: *207 659 6780*, or EMAIL: *sean.taylor@maine.edu*."

If you detect a fire or fire related emergency you are to:

1. Verbally warn others
2. Pull the Fire Alarm station (found at each fire exit door).
3. Call 911 from a safe place and inform the dispatcher of the situation.
4. Meet the emergency responders and other assistance and information.

NOTES for Instructors and Lab Techs:

- Since in many circumstances accounting for the members of your class is difficult at best, we suggest that you ensure that everyone has left before you evacuate the classroom. If someone in your area was unable to evacuate then you need to immediately inform the emergency responders (Police and Fire).
- When assisting an individual who needs an accommodation only ask what accommodation is needed, do not ask for details of the person's disability.
- Coordinator of services for students with disabilities can help arrange accommodations. A plan for aiding the disabled to evacuate is available from Safety & Environmental Management.

Incident Reporting

Types of accidents to be reported

- An unplanned event that causes injury, illness, or property damage.
- A “Near Miss” an incident having the potential to do the above.

Both accidents and near misses are to be reported to the Lab Supervisor and/or Dept. of Safety & Environmental Management 581-4055.

WHAT TO DO WHEN AN INCIDENT OCCURS

1. Assess the situation, don't panic.
2. If the injury is life threatening Call an Ambulance (911), if it is not life threatening call Cutler Health (581-4000) if the event takes place after Cutler Health Center's open hours 98am-5pm) take the person to the emergency room at the EMCC (Eastern Maine Medical Center) in Bangor.
3. Record information on the incident log and fill out the **TIER 1 SEM FORM** found in the IMRC Google Drive folder for staff, or at the Safety & Environmental website:
   http://sem.umaine.edu/forms/
4. Call SEM and report the incident then notify the lab supervisor (207) 659-6780.
5. If someone was hurt or something was damaged do to the malfunction of a machine or tool make sure that Lock Out / Tag Out procedures are followed and the machine or tool is remove from service.

Chemical Hygiene Plan

- Minimize chemical exposure – Try to utilize non-toxic materials. If a hazardous substance must be used be sure to follow guidelines and precautions provided on the container.
- Do not under underestimate risk – If the hazard risk of a substance is not known treat it as if it is hazardous.
- Use ventilation – Utilize the paint spray booth or the mobile extractor tubes that are hanging from the ceiling for use with all known hazardous chemicals.
- Chemicals must be accounted for – All chemicals must be preapproved before being brought into the labs. You must have a copy of the SDS Sheet in hand and the chemicals are logged in the chemical storage file. The chemicals will be constantly checked and culled to keep chemical material from accruing in the labs.

PAINTS

It's important for users to consider all of the chemicals used in the painting process when disposing of the chemicals. Paints and paint pigments can involve toxic materials and heavy metal compounds, such as lead, arsenic and chromium some of which may require PPE and may need to be disposed of properly through EH&S. The application and handling of paints often involves solvents, such as thinners, mineral spirits or turpentine and rags. Solvent contaminated rags, if left for extended periods of time, can potentially start a fire. Please be sure that the solvent rag collection container is firmly closed after adding materials to it.

Disposal of paints:

Latex – latex paint is water based and often thought to be nontoxic. However, trace amounts of formaldehyde, isocyanates and ammonia may be present so practice good safety techniques and use caution when applying. Some of the pigments used in latex paints may contain other metals such as copper and zinc that are not hazardous wastes, but are regulated for discharge in municipal waste waters. Latex paint and associated debris, if left to dry, may be discarded as solid waste in the regular trash because the paint is bound to a solid media. However, if large quantities of latex paint

remain, consider reuse for making things like signs advertising student events on campus.

Acrylic, varnish and oil based paints – acrylic, varnish and oil based paints often containing flammable materials such as methanol, toluene, ketones and naphtha and heavy metals such as lead, cadmium, chromium and mercury in the pigments. If reusing the material for other projects is not practical, the acrylic, varnish or oil-based paints – no matter the quantity – must be managed as hazardous waste. These paints must be collected and managed as hazardous waste and submitted SEM for removal @ 581-4055. These must be collected in a 5 gallon bucket (Labeled Paint and Paint Thinner Only) and always stored in the flammables cabinet. This will be collected by SEM when full.

Aerosols – aerosol paints and any other materials that are dispersed as an aerosol, typically contain a flammable and/or toxic components such as propane, isobutene, or dimethyl ether. Used aerosols must be collected and managed as hazardous waste and submitted SEM for removal @ 581-4055. Please mark as waste and place in the flammables cabinet. Please refer to our hazardous waste guidelines for further guidance.

An important safety note regarding aerosols:

- Since aerosol cans are under pressure, puncturing the container or altering the dispenser may result in physical harm and or injury even if they are empty, trace materials inside the can still present a hazard.
- Do not attempt to puncture or crush aerosol cans.
- Please affix the original container cap to the aerosol can or remove the push button knob prior to collecting ***multiple*** cans in a waste collection container for disposal.

Disposal of paint related materials:

- ***Rags contaminated with solvents*** – rags, lab towels, paper towels contaminated with paint thinner, mineral spirits must be collected and managed as hazardous waste and submitted SEM for removal @ 581-4055. Please refer to our hazardous waste guidelines for further guidance.
    - All rag collection cans must be collected in one of the provided safety cans.
    - The rag collection cans must container a plastic liner.
    - The rag collection cans must be stored entirely closed when not in active use.
    - Rags must not be purposely left out to “dry” &/or evaporate the contents.
- ***Solvents and Thinners*** – solvents, paint thinners, mineral spirits and turpentine are highly flammable materials. After the useful life of the solvent &/or thinner, it must be collected

and managed as hazardous waste and submitted SEM for removal @ 581-4055. Please refer to our hazardous waste guidelines for further guidance.

- The solvent and thinner containers must be tightly closed when not in active use.
- Solvent and thinner containers must not be left open to "evaporate".
- Paint contaminated solvents and thinners are a hazardous waste and must not be poured down the drain.

The lab areas that have been provided with a drum for solvent and thinner found in the flammables cabinet. The following must be abided by for solvent and thinner collection:

- Funnels are not strainers. Strain your solid paint materials prior to pouring the solvents and thinners into the drum so as to not clog the safety funnel.
- When the drum is full, call SEM for HAZCOM pickup and removal @ 581-4055.
- Do not move the solvent and thinner drum from the current location.

If you have any questions as to how to dispose of your paint related materials, please consult your Lab Technician, Facility Faculty, or Safety & Environmental Management at 581-4055.