Integrated Biomedical Engineering and Health Sciences Program

DS/LAB SAFETY MANUAL

Equipment/Tool: All the Equipment in Various Labs (Collective)
Location: Multiple

Document Approval

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Document Revision History

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1. **Introduction and Purpose**

This document is a collective Lab Manual for the lab equipment within the Integrated Biomedical Engineering & Health Sciences (IBEHS) Design Studio (ABB C104), Medical Imaging/Biomaterials Lab (ETB 533), Medical Instrumentation/Robotics Lab (ETB 534), and Genetic Engineering Lab (HSC 4N72).

2. **Scope**

This document outlines health & safety policies within each lab space and for equipment in the labs spaces.

- **Safety**: Outlines important safety standards, principles, and policies that are followed within each laboratory or space.
- **Layouts**: Outlines floorplans and setups within each laboratory or space.

Information on lab procedures and cleaning protocols should be reviewed in the Standard Operating Procedures for each piece of equipment and lab before the equipment is used.

3. **Definitions**

The following are the terms and acronyms that you may find in this document.

- **Critical Injury** – As defined by [Ontario Regulation 834/90](https://www.eontario.ca/en/regulations/834-90), a critical injury is an injury of a serious nature that involves one or more of the following:
  - Places life in jeopardy or produces unconsciousness,
  - Results in substantial loss of blood,
  - Involves a fracture in a leg or arm, but not to a finger or a toe,
  - Consists of burns to a major portion of the body, or
  - Resulting in the loss of eyesight.

- **IA** – Instructional Assistant
- **Hazardous Agent** – Any physical, chemical, radioactive, or biological agent that may pose a health or safety hazard to those exposed.
- **IBEHS** – Integrated Biomedical Engineering & Health Sciences
- **Lab** – Laboratory
- **Lab Tech** – Laboratory Technician
- **SOP** – Standard Operating Procedure that outlines the set of procedures that one should follow while operating equipment within the laboratory or space.
- **Supervisor** – The individual who oversees the operations of the laboratory or space (i.e., Program Director(s), Course Instructor(s), or staff).
4. Course-Specific Safety Orientation for Students

The IBEHS program requires all students to complete mandatory health and safety training and safety orientation before entering a laboratory or space. A general safety outline is posted within laboratories or spaces as well as at the end of each IBEHS course outline; see section 7.

- A supervisor must be present to operate in IBEHS laboratories or spaces.
- Students are not permitted in the laboratory or space unattended.

Health and safety are addressed for each course of the IBEHS program that utilizes a laboratory:

IBEHS 1P10 – Health Solutions Design Projects I: Introduction to Engineering Fundamentals and Design:

- Design Studio in ABB C104
  - Students must complete mandatory safety orientation before using any of the equipment in the Design Studio.
  - The safety orientation is done in groups of five students in September of each year and is facilitated by the IA or Lab Tech.
  - A safety orientation record is maintained for each student.
  - One-on-one orientation is available for students who are unable to attend a group session.
  - Upon completion of the orientation, students must complete an online health and safety quiz, answering all questions correctly, prior to accessing Design Studio facilities and equipment.
  - No students are permitted in the Design Studio without supervision.

- Materials Testing in ETB 534
  - Students have a health and safety orientation prior to use of the materials testing equipment.
  - No students are permitted in ETB 534 without supervision.

IBEHS 2P03 – Health Solutions Design Projects II: Introduction to Genetic Engineering:

- Genetic Engineering Lab in HSC 4N72
  - Lab-specific safety protocols and procedures are instructed during each lab session and are also constantly monitored by a Teaching Assistant and or a Lab Supervisor.
  - No students are permitted in HSC 4N72 without supervision.
IBEHS 3P04 – Health Solutions Design Projects III: Analysis and Decision Making:

- Design Studio in ABB C104
  - IBEHS 3P04 students use the Design Studio for their projects.
  - Health and safety for the Design Studio was covered in Level 1, however Design Studio sessions are all closely monitored by teaching assistants and a supervisor.
  - No students are permitted in the Design Studio without supervision.

IBEHS 4D03 – Introduction to Medical Imaging

- Medical Imaging Lab in ETB 533
  - The Medical Imaging lab does not involve any power tools, hand tools, or equipment that could result in critical injury to a worker in this space.
  - The general safety protocols and guidelines are all posted in the course outline as well as within each lab space close to the entrance/exit for each lab.
  - No students are permitted in ETB 533 without supervision.

IBEHS 4F04 – Biomedical Instrumentation and Measurement

- Medical Instrumentation Lab in ETB 534
  - The Medical Instrumentation lab does not involve any power tools, hand tools, or equipment that could result in critical injury to a worker in this space.
  - The general safety protocols and guidelines are all posted in the course outline as well as within each lab space close to the entrance/exit for each lab.
  - No students are permitted in ETB 534 without supervision.

IBEHS 4P04 – Health Solutions Design Projects IV: Economics and Project Management:

- Design Studio in ABB C104
  - The activities for this course conducted in the Design Studio do not involve any creation of physical prototypes or devices.
  - No students are permitted in the Design Studio without supervision.

IBEHS 5P06 – Biomedical Capstone Design Project:

- Students have access to equipment in any of the IBEHS lab spaces or Design Studio.
  - All students in IBEHS 5P06 attend mandatory lectures on health and safety orientation and must achieve 100% on a health and safety quiz before they can use equipment in the IBEHS spaces.
  - No students are permitted in the labs without supervision.
5. Lab-Specific Health & Safety Considerations / Protocols

The following are the safety protocols and procedures for all equipment present in specific IBEHS lab spaces. The protocols are also included in equipment-specific SOPs (Standard Operating Procedures) that are written and made available in every lab. Student must familiarize themselves with equipment-specific SOPs before using the equipment.

Design Studio (ABB C104):

General Safety:

• Secure long hair and loose clothing.
• Ensure no dangling jewelry is worn.
• Alert those around you when you start using any of the equipment.
• Always use a grounded power cord.
• Do not use equipment with a damaged or broken power cord.
• Do not overextend the cables connected to any of the equipment.
• Do not operate a device that is damaged or working improperly.
• If a device malfunctions during use, inform a supervisor immediately.
• In case of injury, stop using the equipment and inform a supervisor immediately.

Personal Protective Equipment (PPE):

• Safety googles must be worn when using the soldering stations, rotary tool station, and hand tools
• Fume extractors must be used when using the soldering stations.

Equipment Safety:

3D Printers:

• Be cautious as both the heated bed and hot end nozzle will begin to heat up.
  o The heated bed can reach a maximum temperature of up to 110°C which is enough to cause a major skin burn.
  o The nozzle can reach a maximum temperature of up to 250°C.
• Do not touch the nozzle under any circumstances while it is hot (the temperature of the nozzle will be displayed on the LCD while the printer is turned ON).
• The 3D printers may be turned off once the nozzle temperature is below 50°C and the extruder fan has automatically turned off. If the extruder fan has stopped, turn off the printer using the power switch and return all tools to the proper storage areas.
• Always stay clear of the printer’s moving parts while it is 3D printing or performing other automated calibration steps. Inserting your hands or fingers while the printer is activated could result in serious injuries.
Powered Hand Tools:
- Safety goggles or glasses are required for the user and others in the immediate vicinity.
- Do not use work gloves while using any of the rotary tools as they could become entangled in the tool and cause serious injuries.
- Clear the worktable of anything that may interfere with use of the power hand tool.
- Check and clear the surrounding area for tripping hazards.
- Secure the workpiece using clamps to a bench or a vice as applicable.

Knives and Cutting Tools:
- Safety goggles or glasses are required for the user and others in the immediate vicinity.
- Always pick up knives and cutting tools by their handles.
- Never run or walk briskly while carrying a cutting tool.
- Clear the worktable of anything that may interfere with the use of the tool.
- Check the surrounding area for tripping hazards.
- Secure the piece you plan to cut.
- Mark exactly where you plan to cut.
- Cut slowly and away from your body.
- For retractable cutting tools, slide blade out about 1 in.
  - Retract the blade between uses.
  - Do not cut with blades fully extended.
- Do not use knives with broken or loose handles.

Soldering Station:
- Safety goggles or glasses are required for the user and others in the immediate vicinity.
- Wear clothes that cover arms and legs.
- Always use the fume extractor present at the station.
- Keep hot soldering iron away from electric cables.
- Wash your hands thoroughly after each use.
- Turn the iron off and make sure it is cooled down properly before you return it.

Hot Glue Gun:
- Never touch the glue dispense tip at the front of the gun. It can cause burns.
- Use caution as the hot glue gun heats up.
- Place the hot glue gun on the workbench in an upright position using the stand.
- Place scrap paper or cardboard in front of the hot glue gun to catch any drippings.
- Pay attention to the position of the cord during use.
Sewing Machine:
- Safety goggles or glasses are required for the user and others in the immediate vicinity.
- Keep your fingers away from the moving components and ensure all safety shields and guards are in place prior to turning the machine on.
- Never leave the sewing machine unattended and always pay close attention when it is in operation.
- Do not place anything on or around the pressure foot as the machine will run without warning.
- Ensure that all openings are clear of lint or cloth and the settings are appropriate for the task you intend to perform.
- Regularly inspect the needle to make sure it is not bent, dull, or damaged.
- Never use a bent or damaged needle. Always put pins and needles in a pin cushion after use. Never leave them on a table.
- Always turn off the machine first, then disconnect from the power supply when you are removing or replacing work materials/parts. This will prevent electrical hazards and accidental operation of the machine.

Fume Hood:
- The fume hood is currently not in use. Students using the soldering guns must use the fume extractors.

Medical Imaging/Biomaterials Lab (ETB 533):
The equipment present in this lab is only to be used for educational purposes. Proper handling of this equipment is required to safely operate these devices. In case of any kind of injury, stop using the device and inform the lab coordinator immediately.

General Safety:
- Secure long hair and loose clothing to avoid tangles in the machine.
- Alert those around you when you start using any of the equipment.
- Stay clear of any of the moving parts while using these devices. There are pinch points that could cause injury.
- Do not operate any equipment that is damaged or not properly working. If the device looks or sounds faulty inform the Lab Coordinator immediately.

Personal Protective Equipment (PPE):
- Safety goggles are required while performing any tests using Univert Mechanical Testing machines.
• Personal protective equipment is not required for any other equipment in the ETB 533 lab.

**Equipment Safety:**
Below are the equipment-specific safety considerations that we instruct students either in groups or on a case-by-case basis.

**Univert Mechanical Test Systems:**

• Always wear safety goggles while performing any calibration or tests using these machines.
• The mechanical testing machines are capable of causing significant crush injuries to fingers or hands.
• Always stay clear of any moving parts or pinch points while performing any operations on these machines.
• Machines must only be operated by one person. Never, under any circumstances should one person touch the machine or hold a test sample in place while another person operates the machine.

**Optical CT Scanners:**

• The Optical CT scanners use optical light to demonstrate tomographic principles. No ionizing radiation is used in the equipment, and there is no risk of radiation exposure when using the equipment.
• The scanner houses a glass container filled with liquid, but the rest of the scanner is not waterproof, DO NOT immerse the scanner under water or any other fluids.
• DO NOT place or drop any kind of electronics into the liquid in the scanner at any time.
• ONLY hold on to the handles while lifting or placing the scanner down gently.
• DO NOT overextend the cables connected while changing phantoms or handling the glass enclosure containing fluid.

**Ultrasound Scanners:**

• The device has terminal connections that are exposed, DO NOT place the ultrasound on a conductive material that could short the power terminals on the device. Shorting the power terminals with the battery inserted could cause serious to fatal injuries.
• ONLY place the battery and the scanner in their designated holders or holder slots.
• DO NOT use the scanner against any material(s) other than those provided or against your body.
Potential injuries or harmful effects:
  o Thermal mechanism: Heating of soft tissue and bone, overextended exposure times to the ultrasound energy could cause tissue damage. The system is designed to automatically control the output power and not to exceed the safe limits. If you feel discomfort at any level while using the scanner against your body, immediately stop the procedure and consult the lab coordinator.
  o Non-thermal mechanism: Is a mechanical phenomena, like cavitation (formation of gas bubbles). Extended use of ultrasound could cause an increase in cavitation within tissues and could also raise the temperature within these bubbles, causing these bubbles to exert stress on the cells around them. The system is designed to be safe not to cause such phenomena in case you are experiencing any form of discomfort immediately stop the procedure and consult the lab coordinator.

EFNMR – Terranova MRI:
  • The probe (coil part) can get warm when used for prolonged periods. Ensure that the coil is not getting warmer than 40°C. Stop using the device if needed and resume when it is cooled down.
  • The probe is not designed to be dismantled, do not attempt to take it apart.
  • Always keep magnetically sensitive devices at least 3m away from the probe.
  • Always keep any ferrous objects at least 2m away from the probe.
  • Do not overextend the cables connected with the probe. Ensure that the cable is hanging down to the floor in the middle and is not taut between the probe and the spectrometer.
  • When properly operated, there should be no risk of injury.

Medical Instrumentation/Robotics Lab (ETB 534):

General Safety:
  • Secure long hair and loose clothing.
  • Ensure no dangling jewelry is worn.
  • Alert those around you when you start using any of the equipment.
  • Always use a grounded power cord.
  • Do not use equipment with a damaged or broken power cord.
  • Do not overextend the cables connected to any of the equipment.
  • Do not operate a device that is damaged or working improperly.
  • If a device malfunctions during use, inform a supervisor immediately.
  • In case of injury, stop using the equipment and inform a supervisor immediately.
  • ALWAYS be in a good posture while physically handling any of the devices present in this lab to ensure that there is no bodily harm to the user, anyone around, or no damage to these devices.
Personal Protective Equipment (PPE):

- Personal protective equipment is not required in the ETB 534 lab.

Equipment Safety:

- **Modular PCBs** (Printed Circuit Boards):
  - Shorting the positive and negative terminals on these modular PCBs could result in serious equipment damage or bodily harm.

Genetic Engineering Lab (HSC 4N72):

General Safety:
Below are some general lab safety guidelines. These are also posted in the course outline and in the lab. All the health and safety guidelines for each lab are handled by the TA or the lab coordinator. The following checklist safety rules must be observed while the lab sessions are running.

- Do not move any equipment unless advised by the supervisor.
- Any biohazard material must be properly labeled and transported according to SOPs outlined by the University—these are available [here](#).
- All the equipment and surfaces are properly disinfected and maintained contamination-free.
- All samples must be securely sealed to avoid the generation of aerosols.
- Dispose of all waste solutions according to [RMM 502](#).
- Do not lean or place items on any lab instruments.
- Pay attention to any audible indicators for equipment malfunction, report any malfunctions to the Lab Supervisor.
- In case of any unusual behavior from the equipment, stop using it immediately and inform the Lab Supervisor. Wait until any of the moving parts have stopped and proceed with the equipment Cleaning SOP.
- Always be alert while in the lab. Notify your Lab Supervisor immediately if you observe any unsafe practices.
- The use of laptops/cell phones/etc. is prohibited during labs.
- Do NOT eat or drink in this area. You cannot store any food or drink in this area. All water bottles/drinks and any food MUST be stored in your bag so that they are not visible to anyone standing in this area. Do NOT throw out empty food/drink containers in the lab garbage.
• You need to carry your lab coat in a separate plastic bag. Please do NOT wear your lab coat outside the lab space. The hallway is NOT an appropriate place for you to put on your lab coat.

• Please keep your hands away from your face, eyes, mouth, and body while using chemicals or lab equipment. Wash your hands with soap and water in the designated handwashing sink after performing all experiments and before leaving the lab.

• Please make sure that you take notes during the lab safety walk-through, and that you know the location of all the safety features in the lab. Please make sure that you know the proper procedures in case of emergencies and follow all instructions from your Lab Supervisor. These will be discussed during the labs and your safety training.

• Dispose of all chemical waste properly. Never mix chemicals in sink drains. Check with your lab instructor for the disposal of chemicals and solutions. Never dump any chemicals down the hand-washing sink. If you are unsure how to properly dispose of chemical waste, ask the Lab Supervisor and/or consult the appropriate Safety Data Sheet (SDS).

• Do not touch any of the equipment without proper training and supervision by your mentor.

• You cannot work alone in the laboratory. A lab instructor must always be present.

• Please note, if you forget your lab coat or goggles you will be asked to purchase them from the bookstore before attending the labs. We do not provide extra lab coats or goggles.

• Dangling jewelry is a hazard in the laboratory and should be secured or removed.

• Please make sure that you do not walk around the lab and distract other students during the lab period. Please focus on your own work and on safely conducting the lab.

• All chemicals/biologicals in the laboratory are to be considered dangerous. Never handle chemicals without gloves. Always read the SDS before handling any chemicals/biologicals and follow the proper safe handling instructions. Do not taste or smell any chemicals/biologicals.

• Report any accident (spill, breakage, etc.), injury (cut, burn, etc.), or broken equipment to your instructor immediately. Do not panic.

• If you or your lab partner is hurt, immediately yell out the Lab Supervisor’s name to get their attention. Do not panic.

• Perform only those experiments authorized by your mentor or Lab Supervisor. Carefully follow all instructions, both written and oral. Unauthorized experiments are not allowed. If you do not understand a direction or part of a procedure, ask your lab mentor before proceeding with the activity.

**Personal Protective Equipment (PPE):**

• Safety goggles and lab coats must be worn in the lab.

• Make sure that long hair is tied back, and any loose clothing and jewelry are removed or secured.
Equipment Safety:
Below are the equipment-specific safety considerations for students either in groups or on a case-by-case basis.

Vortex Mixer:
- Always use an appropriate vessel for the sample you are working with.
- Ensure the cap or lid is on tight before vortexing.
- Wait 2-5 minutes before opening the vessel after vortexing to reduce liberation of aerosols.
- If the sample is of risk group 2, only open the vessel in a biological safety cabinet or bring the vortex to the biological safety cabinet.

Shaking Incubator:
- Ensure your tubes or flasks are not overfilled (recommended 500ml or less when using a 2L flask and 2ml or less when using bacteriological tubes).
- Ensure your tubes or flasks are closed to prevent splashes if RG1.
- Ensure your tubes or flasks are closed with HEPA filter, vented caps if RG2.
- Make sure the shaker platform is balanced as much as possible.
- Once the shaker is started, watch the shaker to ensure flasks are secure and the platform is balanced
- When retrieving samples, inspect the area to determine if a spill has occurred.

Gel Imager:
- Use caution when inserting media into the imager to avoid spills
- When retrieving samples, inspect the area to determine if a spill has occurred.

Gel Electrophoresis Box & Power Supply:
- Always use gloves because the equipment has been in contact with ethidium bromide and/or dyes
- Be cautious when handling melted agarose – it is hot
- To prevent electric shock, do not apply voltage until the lid is properly placed upon the buffer chambers.
- NEVER put your hands inside the electrophoresis box when it is plugged in.

Pipettes:
- Never turn the knob past the printed volume range for that pipet.
- Always work in the appropriate area (e.g., biosafety cabinet, fume hood, etc.) for the materials you are using
- Never mouth the pipet
- Always use caution when attaching a tip or pipet (especially glass) to a pipet aid
- Do not depress plunger while tip is immersed in the liquid; this causes bubbling of the liquid and can generate aerosols
• Do not forcefully aspirate (draw up liquid) or let go of the plunger while aspirating. This can result in contamination of interior and/or filter of your pipet aid or pipettor contributing to inaccurate measurements and cause cross contamination. Liquids drawn up beyond the pipet capacity or through the filter can become aerosolized.
• Never forcefully dispense liquids out or let go of micropipette plunger, bulb, or other pipet aid devices during dispensing as this can aerosolize your liquids or cause splashing or spilling of hazardous material.
• Do not immerse the tip into liquid while dispensing liquid; this can cause bubbling, generating aerosols
• Do not forcefully eject tips; eject tips carefully into proper used tip container
• Remove serological pipettes from pipet aid carefully, to prevent splashing of liquid remaining in the tip
• Maintain good posture when standing or seated at the bench; ensure you are working at a comfortable height.

Microcentrifuge:
• Make sure you use the correct size tube for the centrifuge. If you do not, the tube might break. The correct tubes are the 1.5 mL sterile micro-centrifuge tubes
• DO NOT use the centrifuge without a TA or Lab Supervisor present.
• You MUST balance the centrifuge. Place tubes, two at a time, across from each other (opposite ends) and make sure the solution in the two tubes is at the same level. If one tube has more solution than the other, this is not balanced.
• Always secure the rotor lid before starting the centrifuge.

Fume Hood:
• Do not place your head inside or lean into the fume hood
• Minimize drafts and sudden movements around the fume hood
• Work a minimum of 15 centimeters inside the plane of the sash
• Do not store equipment or other material inside the fume hood when it is not in use; the inside of the fume hood should always be cleared when not in use
• Keep the end of the sash at a comfortable height just above the elbows and look into the fume hood through the glass.
• Close the sash when the fume hood is not attended
• Set up equipment 5 centimeters above the working surface of the hood to maintain efficient air flow. Ensure that equipment is stable.
• All electrical devices should be connected outside of the hood to avoid sparks which may ignite a flammable or explosive chemical.

Laboratory Bench:
• Wash the bench with 70% ethanol prior to, and after, any work with cells and media
• Clean the bench at the start and end of the day to avoid accumulation of paper and equipment that could be a source of bacterial contamination.
6. **Lab Layouts & Safety Features**

Below are the safety features and layouts within each IBEHS lab space.

<table>
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<tr>
<th>Laboratory</th>
<th>Design Studio</th>
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Design Studio (ABB C104):

**Layout Capture Date: End of Winter 2021**
Medical Imaging/Biomaterials Lab (ETB 533)

Layout Capture Date: End of Winter 2021

*Not to scale*
Genetic Engineering Lab (HSC 4N72):

**Layout Capture Date: End of Winter 2021**

*Not to scale*
7. **General Lab Safety Guidelines and Procedures**

The information below is included in all relevant IBEHS course outlines.

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**Integrated Biomedical Engineering & Health Sciences (IBEHS) Labs/Design Studio Safety**

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**Information for Laboratory Safety and Important Contacts**

This document is for users of IBEHS instructional laboratories at the following locations:

- ABB C104 (Design Studio)
- ETB 533 (Medical Imaging/Biomaterials Lab)
- ETB 534 (Medical Instrumentation/Robotics Lab)
- HSC 4N72 (Genetic Engineering Lab)

This document provides essential information for the healthy and safe operation of IBEHS instructional laboratories. This document is required reading for all laboratory supervisors, instructors, researchers, staff, and students working in or managing instructional laboratories in IBEHS. It is expected that revisions and updates to this document will be done continually. A McMaster University [lab manual](#) is also available to read in every laboratory.

**General Health and Safety Principles**

Good laboratory practice requires that every laboratory worker and supervisor observe the following:

- Food and beverages are not permitted in the instructional laboratories.
- A Laboratory Information Sheet on each lab door identifying potential hazards and emergency contact names should be known.
- Laboratory equipment should only be used for its designed purpose.
- Proper and safe use of lab equipment should be known before using it.
- The lab tech or course TA leading the lab should be informed of any unsafe conditions.
- The location and correct use of all available safety equipment should be known.
- Potential hazards and appropriate safety precautions should be determined, and the sufficiency of existing safety equipment should be confirmed before beginning new operations.
- Proper waste disposal procedures should be followed.
- Personal ergonomics should be practiced when conducting lab work.
- Current University health and safety issues and protocols should be known.
Location of Safety Equipment

**Fire Extinguisher**
On walls in halls outside of labs or within labs

**First Aid Kit**
ABB C104, ETB 533, ETB 534, HSC 4N72 or dial “88” after 4:30 p.m.

**Telephone**
On the wall of every lab near the door

**Fire Alarm Pulls**
Near all building exit doors on all floors

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**Who to Contact**

**Emergency Medical / Security:**
On McMaster University campus, call Security at extension 88 or 905-522-4135 from a cell phone.

**Hospital Emergency Medical / Security:**
For McMaster HSC, call Security at extension 5555 or 905-521-2100 from a cell phone.

**Non-Emergency Accident or Incident:**
Immediately inform the Lab Tech, TA on duty or Course Instructor.

**University Security (Enquiries / Non-Emergency):**
Dial 24281 on a McMaster phone or dial 905-525-9140 ext. 24281 from a cell phone.

**See Lab Tech, TA or Instructor:**
For problems with heat, ventilation, fire extinguishers, or immediate repairs.

**Environmental & Occupational Health Support Services (EOHSS):**
For health and safety questions dial 24352 on a McMaster phone or dial 905-525-9140 ext. 24352 from a cell phone.

**IBEHS Specific Instructional Laboratory Concerns:**
For non-emergency questions specific to the IBEHS laboratories, please contact appropriate personnel below from a McMaster phone:

- Leela Pilli, Labortatory Technician – 26888
- Parmveer Bola, Instructional Assistant – 23521
- Andrej Rusin, Wet Laboratory Technician – 28347
- Alexa Behar-Bannelier, Program Manager – 24548
In Case of a Fire (Dial 88)

When calling to report a fire, give name, exact location, and building.

1. Immediately vacate the building via the nearest Exit Route. Do not use elevators!
2. Everyone is responsible for knowing the location of the nearest fire extinguisher, the fire alarm, and the nearest fire escape.
3. The safety of all people in the vicinity of a fire is of foremost importance. But do not endanger yourself!
4. In the event of a fire in your work area shout “Fire!” and pull the nearest fire alarm.
5. Do not attempt to extinguish a fire unless you are confident it can be done in a prompt and safe manner utilizing a hand-held fire extinguisher. Use the appropriate fire extinguisher for the specific type of fire. Most labs are equipped with Class A, B, and C extinguishers.
   Do not attempt to extinguish Class D fires which involve combustible metals such as magnesium, titanium, sodium, potassium, zirconium, lithium, and any other finely divided metals which are oxidizable. Use a fire sand bucket for Class D fires.
6. Do not attempt to fight a major fire on your own.
7. If possible, make sure the room is evacuated; close but do not lock the door and safely exit the building.

Clothing on Fire

Do not use a fire extinguisher on people.

1. Douse with water from safety shower immediately, or
2. Roll on the floor and yell for help, or
3. Wrap with fire blanket to smother flame (a coat or other nonflammable fiber may be used if a blanket is unavailable). Do not wrap a standing person; rather, lay the victim down to extinguish the fire. The blanket should be removed once the fire is out to disperse the heat.

Equipment Failure or Hazard

Failure of equipment may be indicative of a safety hazard - You must report all incidents.

Should you observe excessive heat, excessive noise, damage, and/or abnormal behaviour of the lab equipment:
1. Immediately disconitinue use of the equipment.
2. Inform your TA of the problem.
3. Wait for further instructions from your TA.
4. TA must file an incident report.
Protocol for Safe Laboratory Practice
Leave equipment in a safe state for the next person - if you are not sure, ask!

Defined Roles

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Assistant (TA)</td>
<td>Leela Pilli</td>
<td><a href="mailto:pillil@mcmaster.ca">pillil@mcmaster.ca</a></td>
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<tr>
<td>IBEHS Lab Technician</td>
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<tr>
<td>IBEHS Instructional Assistant</td>
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<tr>
<td>IBEHS Wet Lab Tech</td>
<td>Andrej Rusin</td>
<td><a href="mailto:rusina@mcmaster.ca">rusina@mcmaster.ca</a></td>
</tr>
<tr>
<td>IBEHS Co-Directors</td>
<td>Dr. Greg Wohl</td>
<td><a href="mailto:wohlg@mcmaster.ca">wohlg@mcmaster.ca</a></td>
</tr>
<tr>
<td></td>
<td>Dr. Michelle MacDonald</td>
<td><a href="mailto:macdonml@mcmaster.ca">macdonml@mcmaster.ca</a></td>
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<tr>
<td>IBEHS Program Manager</td>
<td>Alexa Behar-Bannelier</td>
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</tr>
<tr>
<td>IBEHS Course Instructor</td>
<td>Please contact your specific course instructor directly</td>
<td></td>
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</tbody>
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8. References:

- Environmental & Occupational Health Support Services (EOHSS)
- Risk Management Manuals
- Engineering SOPs
- McMaster Biosafety SOPs
- Ontario Regulation 834/90