UNIT OPERATIONS LABORATORY II

EXPERIMENTAL SAFETY GUIDELINES

ChEn 477 - Fall 2016 Name:

1. Philosophy

Safety is top priority in both industry and in this class. In industry, safety is of such importance that it is talked about constantly. Every meeting you attend usually begins with a discussion on safety. Moreover, most companies expect everyone from the CEO to the newest hourly employee to watch for anyone not following safety protocols and report such behavior. Even simple things like not holding onto handrails while walking up or down stairs is cause for concern and can be reported. The phrase "safety culture" is often used to describe the fact that safety should always be a top priority and should permeate every decision and action.

At the university, we don't have the safety culture that is found in industry. This mainly comes from the fact that students haven't had enough practice. In this class, you are given the opportunity to change this and develop a culture of safety.

2. Familiarize Yourself with the Equipment

Your first task should be to familiarize yourself with the equipment. This can be done multiple ways. The first is to physically examine the apparatus. As you do so, identify at least the following.

1. Each piece of equipment
2. Each measurement device
3. The reason for each measurement device
4. The direction of flow
5. Locations of electrical lines
6. Locations of steam lines

Once you have examined the equipment, you should now seek to understand how you interact with the system. This is done through Labview over the UO lab webpage. As you examine the control panel, identify the following.

1. The process variables that can be controlled
2. The values reported from the measurement devices

Next, you should familiarize yourself with the start-up and shut-down procedures. These are found on the UO Lab webpage for the experiment. You should not only memorize these procedures, you should be able to physically locate each valve, control button, and relevant piece of equipment. Pay particular attention to the following.

1. Are there valves that must be manually opened in this experiment? If so, where are they and what do they control?
2. What can I do to damage the equipment? How will I prevent this?
3. Which direction is the flow?

Now that you have examined the physical system, the control system, and the procedures, you should make sure you understand how these all interact. Consider the following.

1. How does the control panel interact with different pieces of equipment and measurement devices on the apparatus to affect the system?
2. What is controlling the flow?
3. Where are measurements being taken? Are any of the measurements used to control the flow in a feedback loop?

3. Consider Possible Hazards to Health

Make sure to consider the following hazards.

1. Electrical
2. Slipping
3. High Temperatures
4. High Pressures
5. Tripping
6. Mechanical (piercing, crushing, lacerating, puncturing)
7. Toxic Chemicals/Materials
8. Flammable Chemicals/Materials

Now, for any concern listed above, explain the type of failure that could occur that would result in the hazard.

	Concern	**Failure**
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

4. Consider Possible Hazards to Equipment

In addition to hazards to health, improper operation of the apparatus can result in equipment damage. For your experiments, consider adverse effects that can happen if you operate outside of normal ranges. Is it possible to have a catastrophic failure? Is it possible to destroy parts of the equipment through improper operation?

5. Eliminating the Hazards

5.1 Report the Potential Hazards

All of the hazards identified previously can be eliminated, and the apparatus can be safely operated, if the standard operating procedures are followed, students are attentive during operation of the equipment, and operating setpoints are selected to keep the system within safe constraints. Fill out the following table to demonstrate your understanding in this regard.

	Y/N	
Potential electrical hazards?		If yes, identify conditions:
Potential mechanical hazards?		If yes, identify conditions:
Hazardous/toxic chemicals involved?		If yes, identify conditions:
Incompatible chemicals involved?		If yes, identify conditions:
Extra eye protection required?		If yes, specify splash goggles or face shield:
Gloves required?		If yes, specify type:
MSDS reviewed by all team members?		List MSDS sheets reviewed:
Are there high pressures in the system?		If yes, specify:
Are there high temperatures in the system?		If yes, specify:

5.2 Operating Procedures

On a separate sheet of paper, write down (by hand) the start up, shut down, and emergency shut down procedures and be able to explain them to the TA, lab manager, or instructor who will sign below. Also write down which data you can collect, and be able to discuss the details of the data collection.

6. Review Your Commitment to Safety and Ethics

6.1 Review the AIChE Code of Ethics

AIChE Code of Ethics

Members of the American Institute of Chemical Engineers shall uphold and advance the integrity, honor and dignity of the engineering profession by:

- Being honest and impartial and serving with fidelity their employers, their clients, and the public;
- Striving to increase the competence and prestige of the engineering profession;
- Using their knowledge and skill for the enhancement of human welfare.

To achieve these goals, members shall:

- Hold paramount the safety, health and welfare of the public and protect the environment in performance of their professional duties.
- Formally advise their employers or clients (and consider further disclosure, if warranted) if they perceive that a consequence of their duties will adversely affect the present or future health or safety of their colleagues or the public.
- Accept responsibility for their actions, seek and heed critical review of their work and offer objective criticism of the work of others.
- Issue statements or present information only in an objective and truthful manner.
- Act in professional matters for each employer or client as faithful agents or trustees, avoiding conflicts of interest and never breaching confidentiality.
- Treat fairly and respectfully all colleagues and co-workers, recognizing their unique contributions and capabilities.
- Perform professional services only in areas of their competence.
- Build their professional reputations on the merits of their services.
- Continue their professional development throughout their careers, and provide opportunities for the professional development of those under their supervision.
- Never tolerate harassment.
- Conduct themselves in a fair, honorable and respectful manner.

6.2 Review the General Safety Rules for the Lab

Now review the general UO lab safety rules found below.

1. No food is allowed in the laboratory or in the computer area. You may take a short break during non-lecture times to eat lunch or dinner but not in the lab or computer area.
2. All personnel in the laboratory area are required to wear safety glasses, long pants, and covered shoes (no sandals or flip-flops).
3. All students are required to complete ChEn 311 (where HAZCOM training takes place).
4. No labs/equipment may be run/started before the specific lab safety training has been done and the specific lab safety sheet has been passed off with either the instructor, Michael Beliveau, or John Sowa.
5. Experimental work should be completed during the regular class periods. If additional time is needed in the laboratory, you must clear it with your instructor and make an appointment for the use of the laboratory with Mr. Beliveau. At least two students must be present during those additional hours (no one is permitted to work in the lab alone).

6. At least one student from each team must be in the lab when running experiments. This student should be monitoring the experiment so that emergency procedures can be enacted if problems occur.

6.3 Review the Specific UO Lab Honesty Expectations

The AIChE Code of Ethics lists general statements on proper and honest behavior in chemical engineering practice. In regard to UO lab, and our being in a university setting, you are also expected to adhere to the following.

- You must do your own work for the individual assignments.
- You may not discuss your lab with other teams (past or present). You should not seek hints or help from other teams.
- You may discuss data reduction, experimental results, etc. with your current team and use the same main graphs (generated during the data analysis) in final reports.
- You must write all the text of final reports yourself. You should alter the team graphs to fit the flow of your individual report, and generate any new graphs that may be needed to support your arguments.
- You may not use or look at previous reports.
- You must not plagiarize or cheat. Plagiarism and cheating is not tolerated in any profession, including chemical engineering. Plagiarism includes copying your partners work or copying reference material without proper references. If you need to include information in your report that is not your own, you should paraphrase the information and provide a reference. Academic dishonesty will result in a grade of E for the course.

7. Signature of Compliance - Safety

Sign below stating you have identified the possible hazards specific for the _____experiment and understand how to eliminate them (Sections 3, 4, and 5), have memorized and understand how to start up and shut down the apparatus (Section 5), and will operate the system in a safe manner by following the rules of the lab and the AIChE Code of Ethic and operating the apparatus according to the intended design (Sections 5 and 6).

Signature: _____
(Student)

8. Signature of Compliance - Ethics

Sign below stating you act in an ethical and honest manner during this lab by adhering to the ethical expectations outlined in Sections 6.1 and 6.3.

Signature: _____
(Student)

9. Pass Off Your Safety/Ethics Training

Before running the equipment, pass off your safety and ethics training with the instructor, lab manager, or assistant lab manager.

Signature: _____
(Instructor, Lab Manager, or Assistant Lab Manager)