Description:
CH 109 is the laboratory associated with the CH 106 Intro to Chemistry lecture. Concurrent enrollment in 106 is expected. HOWEVER, do not expect that the lecture and lab will always be synchronized! Sometimes you will have labs on subjects not yet covered in lecture, and sometimes the labs will cover material presented weeks earlier in lecture.


Materials:
In addition to the lab manual mentioned above, you will need chemical splash safety goggles. These are available for purchase from the stockroom or the bookstore.

Grading: The lab is graded Pass/Fail. Your TA will explain what you must do to pass the course, but this will include at least the following:

1. Arrive on time and complete every lab safely. If you miss a lab you must do the make-up lab during week 10.
2. If you are absent from more than one lab you will automatically fail the lab.
3. Complete all the pre-lab assignments. Pre-labs are due at the beginning of each class meeting.
4. Turn in all lab reports. Lab reports are due at the beginning of lab one week after completion of the lab.

Prelab Exercises:
Prelab assignments are included in the lab manual. You should answer any questions presented and prepare for the weeks lab before your lab meeting. Pre-labs are due at the beginning of the lab period. Each prelab assignment will be worth 10 points.

Attendance:
Attendance in this lab is mandatory. YOU MUST ATTEND ALL SCHEDULED LABORATORY MEETINGS. If you are not able to attend lab you must notify your laboratory instructor as soon as possible. For a missed lab meeting you must make up the missed lab time during the make-up lab. The make-up laboratory will take place during week 10 of the quarter, during the regularly scheduled lab period. If you miss two or more labs your grade will be a NO PASS.

Lab Reports:
Laboratory reports are due at the beginning of the lab period following completion of the experiment. These should represent your own work, not your partners; do not plagiarize.

Prelab Exercises:
Prelab assignments are included in the lab manual. You should answer any questions presented and prepare for the weeks lab before your lab meeting. Pre-labs are due at the beginning of the lab period. These should represent your own work, not your partners; do not plagiarize.
### LAB SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lab check-in&lt;br&gt;Announcements and registration adjustments and Lab Safety&lt;br&gt;View the Lab Safety Video. A link is available on D2L. Complete the quiz, available on D2L, before returning week 2 or you will not be able to participate in the lab.</td>
</tr>
<tr>
<td>2</td>
<td>Alcohols and Phenols</td>
</tr>
<tr>
<td>3</td>
<td>Aldehydes and Ketones</td>
</tr>
<tr>
<td>4</td>
<td>Tests for Carbohydrates&lt;br&gt;Skip part C. and F.&lt;br&gt;Note: the color change for the Benedict’s test is blue to red.</td>
</tr>
<tr>
<td>5</td>
<td>Peptides and Proteins&lt;br&gt;Skip part E.3</td>
</tr>
<tr>
<td>6</td>
<td>Enzymes</td>
</tr>
<tr>
<td>7</td>
<td>DNA Components and Extraction&lt;br&gt;Skip part B.2 if no microscopes are available</td>
</tr>
<tr>
<td>8</td>
<td>Digestion of Foods&lt;br&gt;Part A has already been completed in Lab 3</td>
</tr>
<tr>
<td>9</td>
<td>Analysis of Urine</td>
</tr>
<tr>
<td>10</td>
<td>Make-up labs&lt;br&gt;Lab Check out</td>
</tr>
</tbody>
</table>

### Laboratory Safety Rules and Procedures

#### Safety Rules

The guidelines below are established for your and your classmates’ personal safety. Failure to adhere to the guidelines below will result in a loss of Lab Technique points.

- **Personal Protective Equipment (PPE)** is used to protect you from serious injuries or illnesses resulting from contact with chemical hazards in the laboratory. Spills and other accidents can occur when least expected. For this reason it is necessary to wear proper PPE. The PPE for student labs consist of goggles, gloves and clothing. Proper PPE is required for all students or they will be asked to leave the lab.

  - **Goggles** – *Goggles must be worn whenever any experimental work is being done in the laboratory to protect the eyes against splashes.* Only indirect-vented goggles are allowed in the student labs and should be worn at all times when any chemical is being used in the lab. These are for sale in the bookstore and stockroom. You should not wear contact lenses in a chemical laboratory. Chemical vapors may become trapped behind the lenses and cause eye damage. Some chemicals may dissolve “soft” contact lenses. The most important aspect of having the goggles fit comfortably is the proper adjustment of the strap length. Adjust the strap length so that the goggles fit comfortably securely and are not too tight. If you find that your goggles tend to fog, you can pick-up anti-fog tissue from the stockroom.

  - **Gloves** – *Gloves should be worn to protect the hands from chemicals.* Gloves are provided through your student fees and are located in the student labs. For health and safety reasons it is important to always remove at least one glove when leaving the student laboratory, this prevents things such as door handles from getting contaminated.
• **Clothing** – *Dress appropriately for laboratory work.* You must wear shoes that cover your entire foot, including the heel. They should fit up near your ankle; leather is preferred but any non-porous material is okay. Your clothing must cover your torso and legs down to your knees. In addition, you are required to wear a department provided lab coat while working in the lab.

• *Eating, drinking and smoking are prohibited in the laboratory at ALL times.* Wash your hands after finishing lab work and refrain from quick trips to the hall to drink or eat during lab. If you take a break, be certain to remove gloves and wash hands before ingesting food or drink.

• *Never work alone in the laboratory or in the absence of the instructor.*

• *Headphones may not be worn in lab.*

### Safety Procedures

• *Know location of safety equipment; fire extinguisher, fire blanket, first aid kit, safety shower, eyewash fountain and all exits.*

• *In case of fire or accident, call the instructor at once.*

  • Small fires may be extinguished by wet towels.

  • If a person’s clothing catches fire, roll the person in the fire blanket to extinguish the flames.

  • In case of a chemical spill on the body or clothing, stand under the safety shower and flood the affected area with water. Remove clothing to minimize contamination with the chemical.

  • If evacuation of the lab is necessary, leave through any door that is safe, or not obstructed; doors that lead to other labs may be the best choice. Leave the building by the nearest exit and meet your TA on the field next to Hoffmann Hall. This would also be the meeting place in the event of an earthquake or other emergency. It is good to know the nearest exits of your lab on the first day of class.

• *Spilled chemicals must be cleaned up immediately.* If the material is corrosive or flammable, ask the instructor for assistance. If acids or bases are spilled on the floor or bench, neutralize with sodium bicarbonate, then dilute with water. Most other chemicals can be sponged off with water.

• *Avoid contact with blood or bodily fluids.* Notify the instructor or stockroom personnel if ANY blood is spilled in the lab so that proper clean up and disposal procedures may be followed.

• *If a mercury thermometer is broken, do not attempt to clean up yourself.* Notify students around you, so that mercury is not spread, then notify your lab instructor or stockroom personnel. The stockroom is equipped for proper clean up and disposal of mercury.
Laboratory Procedures and Protocol

General Etiquette:

• Leave all equipment and work areas as you would wish to find them.

• Keep your lab bench area neat and free of spilled chemicals. Your book bag, coat, etc., should be kept in the designated area at the entrance to the lab, not at your bench.

• All chemical waste must be disposed of in proper containers. Proper disposal of chemicals is important for student safety and proper disposal. Putting chemicals into the wrong containers can lead to injury from unexpected chemical reactions. Mixing waste can also make it more difficult or expensive for PSU to dispose of them. Only chemicals should go into waste jars. Waste jars for each experiment will be provided in the lab. They will be labeled specifying which contents should be placed inside. It is important that you replace the lids to the waste containers. When done with the waste jar, make sure it is placed in a secondary container. Do not put anything down the sink unless you are explicitly told to dispose of it this way. Your instructor will provide specific disposal guidelines when needed. Following these guidelines assists us in lowering the environmental impact of the labs.

There are several locations for very specific waste.
   i. Chemical waste – these containers are **ONLY** for chemical waste generated in the lab. They are each specifically labeled for each lab and waste type. **READ THE LABELS.**
   ii. Contaminated paper waste – this is **ONLY** for paper towels used for clean-up of chemical spills.
   iii. Broken glass – this is **ONLY** for broken glassware.
   iv. Gloves – this is **ONLY** for used gloves.
   v. Normal trash – this is for all other trash that is not chemically contaminated, glass, or gloves.

• Clean your bench and equipment Clean all your glassware- dirty glassware is harder to clean later. Wash with water and detergent scrubbing with a brush as necessary. Rinse well with water. Do not dry glassware with compressed air, as it is frequently oily. The water and gas should be turned off and your equipment drawer locked.

• Clean the common areas before you leave the lab. **Point deductions for the entire class will be imposed if the instructor or stockroom is not satisfied.**

• Return any special equipment to its proper location or the stockroom.

Handling Chemicals:

Obtaining reagents:

• Read the label CAREFULLY. The Chemicals are organized by experiment in secondary containment bins. Make sure the chemical name and concentration match what is required by the experiment!
• Do not take the reagents to your bench.

• We recommend always picking up bottles by the label. If all students do this, then any unnoticed spills when pouring will not cause possible problems for the next user. Remember to wear gloves while working with reagents.

• Do not put stoppers or lids from reagents down on the lab bench. They may become contaminated. Be sure that the lids or stoppers are replaced.

• Do not place your own pipet, dropper, or spatulas into the reagent jar. Pour a small amount into a beaker and measure from that. Please pour on the conservative side to minimize waste and cost of labs. You can always go back for more.

• Do not put any excess reagent back in the reagent jar. Treat it as waste and dispose of it properly.

• When weighing chemicals on the balances, never weigh directly onto the weighing pan. Weigh into a weighing boat or beaker. Any spills on the balances MUST be cleaned up immediately. If you are unclear how to clean a spill, notify your instructor. The balances you are using are precision pieces of equipment and costs up to $4000.

• All chemicals should be treated as potentially hazardous and toxic. Never taste a chemical or solution. When smelling a chemical, gently fan the vapors toward your nose.

• Any chemicals that come in contact with your skin should be immediately washed with soap and copious amounts of water.

**Laboratory Procedures**

• *Never pipet any liquid directly by mouth!* Use a rubber bulb to draw liquid into the pipet.

• *Never weigh hot chemicals or equipment.*

• *When heating a test tube, always use a test tube holder and be certain never to point the open end of the test tube toward yourself or another person.*

• *Handling glass tubing or thermometers:* to insert glass tubing into a rubber stopper, lubricate the glass tubing with a drop of glycerin, hold the tubing in your hand close to the hole, and keep all glass pieces wrapped in a towel while applying gentle pressure with a twisting motion.

• *To prepare a dilute acid solution from concentrated acid, acid should be added slowly to water with continuous stirring.* This process is strongly exothermic, and adding water to acid may result in a dangerous, explosive spattering.

• *Use the fume hood for all procedures that involve poisonous or objectionable gases or vapors.*

• *Never use an open flame and flammable liquids at the same time.*