Welcome to CHEM 235. This course syllabus outlines the agreement between instructor and student for the duration of the semester. The schedule is subject to change (i.e. due to inclement weather or unforeseen circumstances), but the course policies are NOT. Please note that this content is also available on Desire2Learn and students should refer to the course website often for class updates and announcements.

Dr. Kathryn Allen
317 Caputo Hall
717-871-7419
Kathryn.allen@millersville.edu
D2L Course Website:
https://millersville.desire2learn.com

Office Hours:
W 9 – 11 am; R 1 – 2 pm; F 9 – 11 am

Meetings also available by appointment, please feel free to email me or approach me with questions about course content. I am here to help you!

Lecture: MWF 8-8:50 am Roddy 149
Lab Section A: Th 5-7:50 pm Caputo 331
Lab Section B: F 1-3:50 pm Caputo 331

Course Objectives

1. To prepare students for biochemistry
2. To prep students with the ability to draw, interpret, relate, label and name organic structures and functional groups.
3. To prep students with basic organic reactions and equip them with the ability to perform simple three step synthesis.
4. To set students up with the knowledge necessary to understand chemical properties, reactivity, and behavior based on functional group, polarity, and resonance capabilities.
5. To perform simple spectroscopic analysis.
6. To run basic laboratories safely and correctly.
Course Evaluation
Course evaluation is based on 3 mid-term exams, a final exam, Plickers, and laboratory work. Additionally, homework is assigned that may or may not be counted toward your final grade. You have two weeks to decide if you will opt in or opt out of the homework. Course evaluation schemes are given below:

WITH HOMEWORK:

<table>
<thead>
<tr>
<th></th>
<th>Points</th>
<th>Percent</th>
<th>Points</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>Three Mid-Term Exams</td>
<td>300</td>
<td>30%</td>
<td>150</td>
<td>15%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>150</td>
<td>15%</td>
<td>150</td>
<td>15%</td>
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<tr>
<td>Online Homework (12)</td>
<td>200</td>
<td>20%</td>
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<tr>
<td>In Class Plickers</td>
<td>150</td>
<td>15%</td>
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<tr>
<td>Laboratory Work (13 labs)</td>
<td>200</td>
<td>20%</td>
<td></td>
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<tr>
<td>Total Class %</td>
<td>1000</td>
<td>100%</td>
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Letter Grade | Percent | Letter Grade | Percent |
-------------|---------|--------------|---------|
A            | ≥94.0%  | C            | 74.0-77.9% |
A-           | 90.0-93.9% | C-          | 70.0-73.9% |
B+           | 88.0-89.9% | D+          | 68.0-69.9% |
B            | 84.0-87.9% | D           | 64.0-67.9% |
B-           | 80.0-83.9% | D-          | 60.0-63.9% |
C+           | 78.0-79.9% | F           | Below 60.0% |

WITHOUT HOMEWORK:

<table>
<thead>
<tr>
<th></th>
<th>Points</th>
<th>Percent</th>
<th>Points</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Three Mid-Term Exams</td>
<td>450</td>
<td>45%</td>
<td>150</td>
<td>15%</td>
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<tr>
<td>Final Exam</td>
<td>200</td>
<td>20%</td>
<td></td>
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</tr>
<tr>
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<td>150</td>
<td>15%</td>
<td></td>
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C+           | 78.0-79.9% | F           | Below 60.0% |

Dates to note:

- August 28th – First day of Classes
- Sep. 4th – NO CLASS
- Sep. 5th – Drop/Add ends
- Oct. 7th – Oct. 10th – NO CLASS
- Nov. 3rd – Last day to Withdraw
- Nov. 22nd – Nov. 26th – NO CLASS
- Dec. 12th – 16th – Finals
- Dec. 17th – Fall Term Ends

Lecture

Required Lecture Materials

1. Daily online access to the Chemistry 235 D2L course website
2. A Millersville email account
   - If you do not check your Millersville email daily, then make sure it forwards to your primary email

If you opt OUT of the homework, you may purchase any edition without the WileyPLUS option.
**Note:** Less expensive E-book versions of the 6th edition textbook and student solutions manual are available online from the websites above. Also, many used copies of the 4th edition of both the textbook and solutions manual may still be available. The page numbers, chapter numbers, and problem numbers do not always match up, but the content is almost identical to the 6th edition.

4. WileyPLUS Learning – This is an online homework system. You have the option of purchasing the textbook WITH WileyPLUS and doing online homework assignments OR opting OUT of the homework and letting your entire homework grade weight onto your exam grade. **You must notify me by the end of the second week of classes (Sep. 8th) which option you choose. Or you will be automatically enrolled in the homework option.** Please see D2L for the notification protocol. I recommend doing the homework as the homework will be good practice, you can use open notes and you can work in groups.

- WileyPLUS gives you two weeks of free use to try it out.
- You will have three chances to answer each homework question, losing 10% credit for each wrong answer.
- You will have one week for each homework.
- Each homework will contain roughly 20-30 questions, though the number of questions depends on difficulty level and content.
- WileyPlus does not cost anything extra, it is included with the purchase of the textbook WITH WILEYPLUS.

- If you own the textbook, but it does not have the WileyPLUS option, you have these options:
  i. Sell the textbook and buy the one with the WileyPLUS option
  ii. Buy the WileyPLUS option separately. It is $112.95 for the online textbook plus homework. Optionally sell the textbook you have to make up the cost.
  iii. Opt for the no-homework option.

**Tentative Lecture Schedule**

<table>
<thead>
<tr>
<th>Chapter #</th>
<th>Chapter Title</th>
<th>Exam Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1</td>
<td>Covalent Bonding &amp; Shapes of Molecules</td>
<td>EXAM 1 – Sep. 22nd</td>
</tr>
<tr>
<td>Chapter 2</td>
<td>Acids &amp; Bases</td>
<td>EXAM 2 – Oct. 20th</td>
</tr>
<tr>
<td>Chapter 3</td>
<td>Alkanes &amp; Cycloalkanes</td>
<td></td>
</tr>
<tr>
<td>Chapter 4</td>
<td>Alkenes &amp; Alkynes</td>
<td></td>
</tr>
<tr>
<td>Chapter 5</td>
<td>Reactions of Alkenes &amp; Alkynes</td>
<td>EXAM 3 – Nov. 17th</td>
</tr>
<tr>
<td>Chapter 6</td>
<td>Chirality: The Handedness of Molecules</td>
<td></td>
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<tr>
<td>Chapter 7</td>
<td>Haloalkanes</td>
<td></td>
</tr>
<tr>
<td>Chapter 8</td>
<td>Alcohols, Ethers, &amp; Thiols</td>
<td></td>
</tr>
<tr>
<td>Chapter 9</td>
<td>Benzene &amp; Its Derivatives</td>
<td></td>
</tr>
<tr>
<td>Chapter 10</td>
<td>Aldehydes &amp; Ketones (plus some Ch. 17)</td>
<td></td>
</tr>
<tr>
<td>Chapter 11</td>
<td>Enolate Anions</td>
<td></td>
</tr>
<tr>
<td>Chapter 12</td>
<td>Amines and Carboxylic Acids (plus some Ch. 18)</td>
<td>FINAL EXAM – CUMULATIVE, scheduled during finals week</td>
</tr>
<tr>
<td>Chapter 13</td>
<td>Functional Derivatives of Carboxylic Acids</td>
<td></td>
</tr>
<tr>
<td>Chapter 14</td>
<td>Carbohydrates</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 11 (Spectroscopy) will be discussed in the laboratory.

**Note:** If a class is canceled due to bad weather, then the missed exam or quiz will be given the next time the class meets. Check the Millersville University website for campus closure due to storms.

### Required Laboratory Materials

1. Weekly Laboratory Assignments: Handouts printed from the Chemistry 235 D2L Course Website one week prior to lab. These will include short lab questions to be handed in the following week.

2. Molecular Model Kits for Organic Chemistry

3. Scientific calculator capable of exponential notation, square roots, and logarithmic functions


5. One (1) set of Safety Goggles or Glasses - Over-The-Glass (OTG) means over prescription glasses. Examples from Google searches for safety glasses and goggles or OTG safety glasses:

6. Combination lock for lab drawer.

### Tentative Laboratory Schedule* (Caputo Hall 331, Th. 5-7:50 pm OR F. 1-3:50 pm)

<table>
<thead>
<tr>
<th>Week</th>
<th>EXPERIMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Check-in</strong> // Lab 1 – Covalent structures and line bond structures</td>
</tr>
<tr>
<td>2</td>
<td>Lab 2 - Functional Groups/Nomenclature</td>
</tr>
<tr>
<td>3</td>
<td>Lab 3 – Acids and Bases</td>
</tr>
<tr>
<td>4</td>
<td>Lab 4 – Alkene reactions</td>
</tr>
<tr>
<td>5</td>
<td>Lab 5 – Chirality</td>
</tr>
<tr>
<td>6</td>
<td>Lab 6 - S_N1 vs S_N2 Reactions: A Study on Nucleophilic Substitution of Alkyl Halides</td>
</tr>
<tr>
<td>7</td>
<td>Lab 7 - Alcohol Elimination: Preparation of an Alkene</td>
</tr>
<tr>
<td>8</td>
<td>Lab 8 - Nitration of a Substituted Aromatic Ring**</td>
</tr>
<tr>
<td>9</td>
<td>Lab 9 - Analgesics &amp; Thin Layer Chromatography (TLC)</td>
</tr>
<tr>
<td>10</td>
<td>Lab 10 - Oxidation of Benzaldehyde</td>
</tr>
<tr>
<td>11</td>
<td>Lab 11 - Vanillin Reductive Amination</td>
</tr>
<tr>
<td>12</td>
<td>Lab 12 – Synthesis of Aspirin: Fischer Esterification</td>
</tr>
<tr>
<td>13</td>
<td>Thanksgiving Recess – NOTE: No Lab this Week</td>
</tr>
<tr>
<td>14</td>
<td>Lab 13 – Synthesis Lab</td>
</tr>
<tr>
<td>15</td>
<td><strong>Check-Out</strong></td>
</tr>
</tbody>
</table>

*Note: order of experiments subject to change.

** this lab may be replaced by a dry lab.
General Course Policies

- **Safe and Productive Environment**: Millersville University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University’s Title IX Coordinator. The only exceptions to the faculty member’s reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project.

- **Attendance**: Students are expected to attend every lecture and every laboratory*.  
  o *Please see Make-up policy for missed laboratories.

- **Make-up Policy**: Students who miss a mid-term exam will be weighted heavier on their final exam as a make-up. You cannot make up the final exam except in emergencies. There is no makeup for homeworks*, plickers* or labs. **You will receive a zero for a missed lab.**  
  o If you receive a zero for two or more labs you will fail the course. If you think you will miss a lab, notify me ASAP!  
  o *Please see Homework and Quiz policies for drop options.

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Please see the University Attendance Policy for more information. Flexibility in the above policies is at the instructor's discretion. [http://www.millersville.edu/registrar/faculty/attendance_policy.php](http://www.millersville.edu/registrar/faculty/attendance_policy.php)

- **Online Homework**: You will have one week to complete the online hwk. It is LONG! DO NOT LEAVE IT TO THE LAST MINUTE. You will have three chances at each question; there will be a 10% penalty for each incorrect answer. There are hints and helpful links to help you along the way. You may drop the lowest two homework scores.

- **Plickers**: Plickers will be given at the beginning of lab. Plickers are meant to review concepts covered in lecture for the week and may represent test questions. You may drop the lowest two weeks of Plickers grades. In the event no Plickers are offered for the week, no Plickers grade is counted or penalized toward the student.

- **Lab**: You will be graded on lab questions handed in one week after each lab. You will be graded on lab preparedness, etiquette, and proper lab attire. You will be penalized if you don’t arrive in lab prepared. There is no making up a missed lab. However, at the instructor’s discretion a dry lab may be given as a replacement. In the event that scheduling permits it, the student may attend the other section of CHEM 235 lab to make up a wet lab.

- **Academic Accommodations**: Please see the Office of Learning Services in Lyle Hall ([http://www.millersville.edu/learningservices/](http://www.millersville.edu/learningservices/)) as soon as possible if you have special learning needs for this class. If you have a condition that may affect your ability to perform laboratory exercises, to exit lab safely from the premises in an emergency, or which may cause an emergency during class, or lab, please discuss this in confidence with your instructor and someone at the Office of Student Support Services. Appropriate accommodations may then be provided. If you are pregnant, please see your doctor regarding the safety of working in a lab.

- **Don't Be a Distraction**: Feel free to ask questions in lecture; however, socializing and chatting during class is rude and unfair to those students interested in learning and participating. If you persist in talking during class, you will be asked to leave. Please note that the instructor reserves the right to take disruptive behavior such as habitual tardiness, frequent or excessive talking during class, cell phone disruptions, or leaving before class is over, into account when determining your final grade.

- **Academic Honesty Policy**: If you break the academic honesty policy of Millersville University, there are severe penalties. A failing grade will be assigned and you may be prosecuted by an Academic Review board. Actions that Violate the Academic Honesty Policy are:
  
  o **Plagiarism** – Plagiarism is the inclusion of someone else’s words, ideas, or data as one’s own work.
Fabrication – Fabrication is the falsification of research or other findings.
Cheating – Cheating is the act or attempted act of deception by which an individual tries to misrepresent that he/she has mastered subject matter in an academic project or the attempt to gain an advantage by the use of illegal or illegitimate means.
Academic Misconduct – Academic misconduct is the violation of University policies by tampering with grades or participating in the distribution of any part of a test before its administration.

Tips for Success:
Do not try to memorize every individual thing for this course. It will not work well. Instead, try to focus on the major concepts, and examples, and develop some flexibility in the application of those concepts to new examples. While there are fundamental principles, concepts, structures, and vocabulary that must be memorized, successful completion of this course depends upon your ability to problem solve by utilizing newly acquired information.

- Be curious.
- Don’t get behind.
- Do all of the assigned readings before the lecture.
- You are responsible for material in assigned readings, even if we do not cover it in class.
- Work lots of problems. Then do more problems!
- Devote time to this class! You are not given a grade; you earn your grade. You cannot realistically expect to learn even the basics of a subject by spending the typical 1 to 2 hours a week that many students report putting into a course.
- A minimum rule-of thumb in study time for each course you are taking should be about 2 hours for each 1 hour spent in class per week. That is, 6 hours of study time outside of class for a typical 3 hour per week lecture course.
- Ask questions! There is no such thing as a “dumb” question.
- Get help when needed!!! Don’t put it off.
- Put in the time and work hard.
- Call or stop by the tutoring office in Lyle Hall for extra help. [http://www.millersville.edu/tutoringcenter/schedules/chemistry.php](http://www.millersville.edu/tutoringcenter/schedules/chemistry.php).
Lab Guidelines

• If you are not properly prepared, you will be penalized.
  o You must have closed toe shoes
  o Long hair must be pulled back
  o Your pre-lab must be complete
  o You must have safety glasses

• Lab notebook instructions
  1. Number all of the pages from #1 to #80 in the upper right corner.
  2. Leave the first five pages blank.
  3. Write “Table of Contents” at the top of page #1
  4. Write “Week #1” at the top of page #6. This is where you will start your first week of labs.

  Suggested format:
  1. Week #, Title and date of each experiment on each page used at the top of the page. (use these to fill in your table of contents)
  2. Reactions & Structures: hand drawn line structures of all organic and inorganic molecules used in lab. If there are no reactions/structures, ignore this section. Follow this format:

<table>
<thead>
<tr>
<th>Compound Name (Formula)</th>
<th>Structure</th>
<th>Melting Point/Boiling Point</th>
<th>Safety Hazards</th>
<th>Molecular Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dihydrogen Monoxide (H₂O)</td>
<td>![Structure Image]</td>
<td>Mp: 0 C Bp: 100 C</td>
<td>Drowning hazard</td>
<td>18 g/mol</td>
</tr>
</tbody>
</table>

For Reactions:

\[ 2H₂(g) + O₂(g) \rightarrow 2H₂O(g) \]

3. Introduction: 4 to 5 concise sentences describing the purpose of the lab experiment. What will you be doing, how will you do it and WHAT DO YOU EXPECT FOR YOUR RESULTS?
4. Experimental Plan: concise step-by-step outline or flowchart of the experimental plan. You will not be allowed to bring lab instructions in with you – write everything you need to know in your lab notebook!
5. Observations and Data: immediately record raw data by writing down whatever happens, when it happens, in first person, brief, declarative sentences.
   a. Plan and use tables for collecting your data. Use the lab handouts as guidelines.
   b. Include drawings, graphs and plots if appropriate.
   c. Use code numbers & letters for any unknown samples you analyze
   d. Securely fastened all handouts spectra, graphs or worksheets into your notebook.
   e. All graphs, spectra, drawings, etc. must be completely labeled.
6. The Discussion of results should reflect on what you did. This is where you think. Use this section to understand the data, observations, reaction, and mechanism. Do not just restate information from previous sections. Instead, explain it. If you determined the quantity or identity of an unknown sample, state the concentration or identity and be sure to include the identification code of the sample. This should be at least two good-sized paragraphs.
7. Conclusions: summarize your goals, what you did, and what you found. This should be a few sentences in length.

A portion of your lab grade will include your attention to proper use of equipment, correct set up, proper labeling of chemicals, safety (including waste disposal) and clean up of your working space. At the end of the semester, you will be given a final lab exam. This exam will assume all of the above points have been completed. You cannot cut and tape/staple lab reports into your notebook, you must hand-write everything.
Safety Philosophy:
We enforce safety regulations in the Chemistry Department because safety training is an essential part of becoming a qualified scientist. Good science is safe science. Our safety rules are the same as those widely used in industrial and academic labs. These rules are based on years of experience in hundreds of labs. We also want to keep the risk of injury well within acceptable limits and to minimize both short- and long-range toxicity problems. We would also like to avoid damage to the building and equipment, which often is the result of unsafe practices.

Laboratory Safety Rules
1. **Be slow**: It is dangerous to move too fast while handling toxic and flammable chemicals or breakable glass.
2. **Be thoughtful**: Think your actions through before you do carry them out.
3. **Be inquisitive**: If you are not sure of something...ask me (your instructor).
4. **Be responsible**: Danger associated with spilled chemicals or broken glassware is avoidable. Report accidents.
5. **Be prepared** for the experiment before lab. Think about what you are doing and plan ahead.
6. **Eye protection**: Always wear safety glasses or safety goggles.
7. **Never eat** or drink *anything* in lab.
8. **Never solo**: Never work alone in the lab.
9. **Dress smart**: Always wear proper laboratory attire in lab. Wear older clothing to lab. 
   a. Shoes that cover the top of the foot are required. *No Flip-flops, sandals or open top shoes.*
   b. Wear long pants & shirts that cover all of your torso area. *No shorts.*
   c. Laboratory coats or aprons can also be used to protect you and your clothing.
   d. Latex or nitrile gloves are available in the lab.
   e. Confine long hair and loose clothing, such as baggy sleeves, hood strings, etc.
10. **Be neat & tidy**: Keep your work area clean. Keep personal belongings (e.g. backpacks) by the door to the lab. Clean up all spills immediately. Keep the balances clean. Broken glassware should be placed in the designated container - not in the trashcans.
11. **Chemistry in the Fume Hood**: Use the fume hoods for experiments as much as possible.
12. **Breathe clean air**: Avoid breathing vapors of any kind. If vapors (gases and/or smells) are being produced by an experiment, move it to a fume hood immediately!
13. **Minimize contact**: Avoid direct contact with chemicals. Many chemicals can be absorbed directly through the skin. If you come into contact with chemicals, rinse chemicals from the affected area with large amounts of running water and inform your instructor.
14. **No pipetting by mouth**: Always use a pipet bulb to fill a pipet. Never fill or dispense a pipet by mouth.
15. **Acid into water**: No volcano. Always pour concentrated acids into water when diluting.
16. **Point away**: Always point reaction vessels away from you & others.
17. **No fires**: No open flames or excessive heat in lab. Do not heat anything to dryness.
18. **Regulate the electric**: Plug into variable power sources (power mites) when using the heating mantles, not the regular electrical outlet.
19. **No put backs**: Excess reagents obtained, but not used should never be returned to the original bottle. Put chemical leftovers into the proper waste container. Products isolated from an experiment should be placed in a designated collection container or the proper waste container.
20. **Never down the drain**: Excess reagent chemicals, products or waste residue from an experiment should never be washed down the drain - dispose of them in the proper waste container.
21. **No pressure**: No reactions in a closed system. Don’t heat a closed apparatus. Glass pressure cooker, no?
22. **Start small**: Whenever a new reaction is attempted, proceed cautiously at first. If feasible, try it on a very small scale first. If one reagent is to be added to another, first add a tiny amount and observe results.
23. **No pranks**: Horseplay, acts of mischief, and startling loud noises are dangerous and not permitted.
24. **Flammable & explosion prone.** Most organic liquids are flammable; many form explosive mixtures with air.

25. **You must report** any and all accidents, fire, and injuries to the instructor promptly! **Please report** any dangerous conditions or practices that you observe to the instructor!

### Emergency Procedures

**Fire extinguishers:** Carefully note the location of fire extinguishers, safety shower, and eyewash station so that you can get to them instinctively in an emergency. Note the exits that are provided in the laboratory.

**In case of fire or accident, notify the instructor immediately.**

**Burning reagents:** First notify the instructor. If feasible, remove all nearby combustible materials, particularly flammable liquids, to avoid secondary fires. Small amounts of burning liquids usually bum themselves out harmlessly in a few minutes; a panicly overreaction may result in breaking the container and spreading burning liquid over a wide area. It may be feasible to cover the container to smother the fire. Water is ineffective on burning organic liquids, except from a "fog" nozzle as available in fire departments.

**Electrical fires:** Notify instructor. DO NOT use water. If feasible, unplug the device. Use CO2 extinguisher if available, otherwise a dry-chemical one.

**Burning clothing:** Prevent the person from running and fanning the flames. Rolling the person on the floor will help extinguish the flames and prevent inhalation of the flames. If a safety shower is nearby, hold the person under the shower until the flames are extinguished and chemicals washed away.

**Burns (thermal or chemical):** Flush the burned area with cold water (preferably ice water) for at least 15 minutes. Resume if pain returns. Wash the chemicals off with a mild detergent and water. If chemicals are spilled on a person over a large area, remove the contaminated clothing while under the safety shower. Seconds count and time should not be wasted because of modesty. Get prompt medical attention.

**Chemicals in the eye(s):** Flush the eye with copious amounts of water for 15 minutes using an eyewash fountain or bottle, or by placing the injured person face up on the floor and pouring water in the open eye. Hold the eye open to wash behind the eyelids. After 15 minutes of washing, obtain prompt medical attention, regardless of the severity of the injury.

**Minor Cuts:** This type of cut is most common in the organic laboratory and usually arises from broken glass. Wash the cut, remove any pieces of glass, and apply pressure to stop the bleeding. Get medical attention.

**Major Cuts:** Apply firm pressure, wrap the injury, and get immediate medical attention.

**Major Injury:** Avoid moving the patient, unless absolutely necessary to protect him/her from further serious injury. Apply first aid measures to control bleeding, assist respiration, and administer CPR if appropriate. If you are not familiar with the needed first aid measures, try to locate someone nearby to help. **CALL 911.**

**Ingestion of chemicals:** Do NOT attempt to give antidotes to induce vomiting. If the victim is conscious, have him/her drink large amounts of water. Seek medical attention. It is extremely useful to the treating physician to know the exact substance(s) that was (were) ingested. If possible, take along the reagent bottle(s).

**Medical assistance.** Routine cases should be handled by taking the patient to the infirmary. From there they will be referred to a hospital emergency room if necessary. For very serious cases in which time seems crucial, 911 should be called.

### Useful Laboratory Resources, & Websites

**Spectral Database for Organic Compounds SDBS:**
For detailed information on specific chemicals:
   - The Merck Index
   - The CRC Handbook of Chemistry and Physics
   - Aldrich Chemical Catalog in print or online at http://www.sigmaaldrich.com
   - National Institute of Standards & Technology: http://webbook.nist.gov/chemistry/

For organic chemistry literature searches:
   - http://www.library.millersville.edu/libguides/chemistry

Environmental Health & Safety Resources:
   - EH&S website: http://www.millersville.edu/hr/ehs/workplace-safety.php
   - Waste labels: http://www.millersville.edu/hr/ehs/hazardous-waste-labels.php
LAB CONTRACT: I, ____________________________, have read, understood, and will abide by all Laboratory Safety Rules, Emergency Procedures, and Waste Disposal Instructions. I will ask questions if I am unsure about anything related to safety or waste disposal in this laboratory.

NAME (Printed)________________________________________________
Signature____________________________________________________
Course & Section_______________________________________________

The copy above is for your records. Sign and tape it into front or back cover of your laboratory notebook. Please detach and turn in the copy that follows...

LAB CONTRACT: I, ____________________________, have read, understood, and will abide by all Laboratory Safety Rules, Emergency Procedures, and Waste Disposal Instructions. I will ask questions if I am unsure about anything related to safety or waste disposal in this laboratory.

NAME (Printed)________________________________________________
Signature____________________________________________________
Course & Section_______________________________________________