

Organic Chemistry Laboratory 1  
CHE 310L-011, -012  
Spring 2009

*Instructor:* Dr. Bradley Sieve

Time Tue 1:40-4:40 or Wed 2-5:00 PM

Place: SC 461

*Office:* SC 452

email: sieveb1@NKU.edu

*Phone:* ext 6547

Office Hours: M: 11-12; W: 1-2; R: 11-12; open door policy and others by appointment  
Outside office hours I have an open door policy, meaning feel free to approach me in my office at anytime. Though if possible make appointments outside posted hours to insure availability.

Learning is not a spectator sport. Fundamentally, the responsibility to learn is the students and the students alone. For Learning to happen in the course you must come to class prepared. This means having examined the material and have a basic understanding before lab. This will allow you to easily follow labs and receive the most information from them.

Student Learning Outcomes:

1. Use standard laboratory techniques and equipment to synthesis, purify, and characterize organic compounds.
2. Discuss the mechanisms whereby organic reactions occur, predict the outcomes of specific reactions, and interpret data to explain reactions.
3. Use chemical literature as reference material.
4. Maintain laboratory records and write laboratory reports using standard techniques and formats.

In fulfilling these student learning outcomes the student will also fulfill the following departmental learning outcomes:

1. Explain the major concepts and experimental findings in the chemical sciences.
2. Demonstrate the ability to carry out experimental protocols using modern instrumentation and methods.
3. Apply computer technology and other technologies in the comprehension, interpretation, and presentation of the chemical sciences.

Prerequisite: C or better in CHE 121 and CHE121L

Co-requisite: CHE 310 \*\*\*\*If a student withdraws from the 310 lecture at any time, he / she must also withdraw from the lab\*\*\*\*

Text:

"Techniques in Organic Chemistry", Jerry R. Mohrig

Organic Chemistry I Laboratory Experiments Supplemental, Online Site

(<http://www.nku.edu/%7Echemistry/che310l.html>)

Not required but the Ege textbook used in lecture is very helpful to have access to during the term

Required supplies:

Laboratory Notebook that makes copies (from bookstore)

Safety Goggles with side shields

A **nonprogrammable** scientific calculator (programmable calculators and cell phones will not be allowed to be used during quizzes and exams)

Preparation: Students are to come to lab with a thorough understanding of the principles involved in the experiment, the goals of the experiment, and the procedures to be followed. The laboratory notebook must contain a completed protocol for each experiment, as specified in the lab supplement, prior to entering the lab. This protocol may be reviewed by the professor prior to beginning the experiment if not completed you will not be allowed to complete the lab. **No text book or supplement will be used or present in the lab hood during the laboratory period. Also all physical constants such as m.p., b.p., and densities must be found before lab.**

LAB REPORTS ARE DUE AT THE VERY BEGINNING OF THE NEXT LAB PERIOD. If you need help with the lab report, I am happy to assist you if you come to me prior to the lab class in which the report is due. Do not wait until the last minute to do your lab report. I may not give any assistance if you ask on the day that the report is due as that would be unfair to the students who have turned in their report on time. No reports will be accepted after the end of class on the week following the report due date.

#### Tentative Grading Scheme

|                                  |                 |
|----------------------------------|-----------------|
| Melting Pt./Molec. modeling (2x) | 25 pts.         |
| All other experiments (10x)      | 50 pts. each    |
| 4 pre-lab quizzes                | 10 pts. each    |
| Midterm exam                     | 100 pts.        |
| Final exam                       | <u>125 pts.</u> |
| Total Points                     | 815 pts.        |

Grading Scale Total Points Needed

|            |          |
|------------|----------|
| 90 - 100 % | <b>A</b> |
| 80 - 89 %  | <b>B</b> |
| 70 - 79 %  | <b>C</b> |
| 60 - 69 %  | <b>D</b> |
| 0 - 59 %   | <b>F</b> |

#### Break-Down of Experiment Grading

|   |         |
|---|---------|
| Notebook (protocol, data, and observations) | 10 pts. |
| Questions and calculations                  | 15 pts. |
| Yield/Purity                                | 15 pts. |
| Conclusions                                 | 10 pts. |

These values will vary some with each experiment. The points will be halved for the 25 point labs.

Preparation for class: Each week you must come to class having thoroughly read and understood the experiment that you will perform that day. To ensure that you are prepared, a pre-lab quiz worth 10 points may be given at the start of the period. If you are more than 30 minutes late to class you will not be allowed to complete the lab for that week. **If you are late for lab or miss that lab you MAY NOT make-up the quiz under any circumstances!!!!**

Attendance: If a lab experiment is missed a grade of zero will be assigned for that lab. Failure to attend 11 of the 13 laboratory sessions will result in a failure for the semester. If a lab is missed it is the student's responsibility to find a time that will work for the make-up. I will do my best to work with the student but if a time can not be found the student will receive a zero for that lab. **Everything that you do MUST be done in your lab notebook. You don't need to print out the data sheets that go with each lab as I do NOT require that you turn them in nor will I accept/review them.**

The above sections will be graded on neatness, content, readability, and spelling. Each section of the notebook should be labeled and in the following order: Title, purpose, chemical reaction equation (with physical data listed under each chemical), protocol (written in the left side column), data and observations (written in the right side column), calculations, conclusions

Data and observations should consist of the ACTUAL amounts reagents that are used by the student, as well as anything that you see, hear, or smell (that is related to your experiment) while doing the lab. The color and physical states of reagents, intermediates and products should also be noted. The data section should contain the actual amounts of reagents / products used or obtained in the experiment. It is not sufficient to list the theoretical amounts of reagents needed in the protocol section and to assume that this was in fact the exact amount of a reagent that you actually used. If, for example, the protocol says to use 1.0g and you did in fact weigh out exactly 1.0g, then write 1.0g in the data section as well though this will be a very rare occurrence. The data and observations must be initialed the instructor when the experiment is completed. Before leaving the lab, your top copy notebook pages containing the protocol through data and observations should be turned in to the instructor. All work must be recorded in pen and any mistakes written in the notebook should be crossed out with a single line, not a big scribble cloud.

Calculations, with all the work (formulas used) shown as well as the conclusion section should be done in the lab notebook also. These calculations will show each step not simply the end results how you got the answers is just as important as the final answer. Points will be deducted if only the answer appears. If any instrumental analysis is done a data table of results should be included in the notebook.

The conclusion section should be done in paragraph form and should contain the following information. State the purpose of the experiment (why did we have you do the experiment) and whether or not it was achieved. A general statement of the techniques and/or type of reaction done. Names of starting materials and product(s). List any important results or findings, such as % recovery or the proof of identity and purity of an unknown. Give an interpretation of the results including any instrumental analysis information. Lastly, discuss any meaningful sources of error and how they influenced your results.

Late assignments will be reduced 2 points per school day up to one week late then will not be accepted.

Additional safety rule. There will be no shorts or other clothing in which the legs are bare. Open toe shoes are also forbidden. Anyone who arrives in the forbidden garb will not be allowed to enter lab and will take a zero for that lab. Make-up due to garb will be allowed only once after that the option will not be allowed.

### **Policies of the Department of Chemistry at Northern Kentucky University:**

- All items on the syllabus are subject to change at the discretion of the instructor
- Students are responsible for reading and understanding the syllabus. Any items that are not understood need to be brought to the attention of the instructor within the first two weeks of the semester
- The work that you do in this course is subject to the Student Honor Code. The Honor Code is a commitment to the highest degree of ethical integrity in academic conduct, a commitment that, individually and collectively, the students of Northern Kentucky University will not lie, cheat, or plagiarize to gain an academic advantage over fellow students or avoid academic requirements.
- Cheating will not be tolerated. Faculty members have the right to determine actions to be taken when a student is caught cheating.
- Faculty members have the right to dismiss or have removed disruptive students from their classroom.
- No cell phones or pagers will ring or be used in the classroom.
- Personal music sources will not be allowed inside the laboratory.

Students with disabilities who require accommodations (academic adjustments, auxiliary aids or services) for this course must register with the Disability Services Office. Please contact the Disability Service Office immediately in the University Center, Suite 320 or call 859-572-6373 for more information. Verification of your disability is required in the Disability Services Office for you to receive reasonable academic accommodations. Visit the Disability Services website at [www.nku.edu/~disability/](http://www.nku.edu/~disability/).

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**Schedule:**

| Date:    | Experiment:                               |
|----------|---|
| 1/13,14  | Check in and Melting Point                |
| 1/20,21  | Recrystallization                         |
| 1/27,28  | Unknown Purification and Identification   |
| 2/3,4    | Fractional Distillation                   |
| 2/10,11  | Acid/Base Extraction                      |
| 2/17,18  | Thin Layer Chromatography                 |
| 2/24,25  | Column Chromatography                     |
| 3/3,4    | Mid-Term (through TLC)                    |
| 3/10,11  | Fall Break                                |
| 3/17,18  | Molecular Modeling                        |
| 3/24,25  | Nucleophilic Substitution (Sn1)           |
| 3/31,4/1 | Stereochemistry Bromination               |
| 4/7,8    | Dehydrogenation                           |
| 4/14,15  | Carbocation Rearrangement                 |
| 4/21,22  | Carbocation Rearrangement continued (NMR) |
| 4/28,29  | Final (CC to CR)                          |

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