

Organic Chemistry Lab II CHE 311-011
Spring 2009

Thursday 1:40p.m.-4:40p.m., SC 465

Instructor: Gwen Fields office: SC 442 Phone: 572-6681

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Prerequisite: CHE 310 and 310 lab Co-requisite: CHE 311

***If you withdraw from the lecture, you MUST withdraw from the lab as well**

Text: Mohrig *et al.* "Techniques in Organic Chemistry", 2nd ed.

The procedures for each experiment must be downloaded from the dept's website,
www.nku.edu/~chemistry/che3111.htm

Equipment: Safety glasses and Laboratory research notebook

Preparation: Students are to come to lab with a thorough understanding of the principles involved in the experiment and a completed protocol in the laboratory notebook, as shown on page 6 of the online introduction. One addition is that a purpose should be given after the reaction or reagents. This protocol is to be initialed by the instructor prior to beginning the experiment. No text book or supplement will be used during the laboratory period.

Laboratory Schedule

| Date | Experiment | Due date |
|-------------|---|-----------------|
| 1/15 | Check-in / Luminol(partners) | 1/22 |
| 1/22 | Sep and Spectroscopy (partners) | 2/5 |
| 1/29 | Sep and Spectroscopy | |
| 2/5 | Ether synthesis | 2/12 |
| 2/12 | Aldehydes and Ketones | 2/26 |
| 2/19 | Aldehydes continued | |
| 2/26 | Hydrolysis of Benzonitrile | 3/5 |
| 3/5 | Acetylation of Benzoin | 3/19 |
| 3/12 | SPRING BREAK | |
| 3/19 | Midterm Exam (luminol thru benzonitrile) | |
| 3/26 | Multistep synthesis | 4/16 |
| 4/2 | Multistep cont. | |
| 4/9 | Multistep cont. | |
| 4/16 | Aldol Condensation | 4/23 |
| 4/23 | Wittig Synthesis | 4/30 |
| 4/30 | Final Exam- check-out | |

LAB REPORTS ARE DUE AT THE VERY BEGINNING OF THE NEXT LAB PERIOD UNLESS OTHERWISE INDICATED. If you need help with any part of a report, you must get assistance BEFORE the day that the report is due. Do not come to lab on the day the report is due and expect me to be able to answer questions that you didn't understand. It is unfair to the other students who came prepared.

Tentative Grading Scheme

| | | |
|---|---------------|------------|
| Aldehydes, Spectroscopy, and Multistep Syn. | 100 pts. each | 300 |
| All other experiments(6) | 50 pts. each | 300 |
| Midterm exam | 125 pts. | 125 |
| Final exam | 125 pts. | <u>125</u> |
| Total Points | | 850 |

According to the point system above, reports represent 71% of your grade. The exams will be worth 29% of your final grade.

| <u>Grading Scale</u> | <u>Necessary total points</u> |
|----------------------|-------------------------------|
| 90 - 100 % A | 761-850 |
| 80 - 89 % B | 676-760 |
| 70 - 79 % C | 591-675 |
| 60 - 69 % D | 506-590 |
| 0 - 59 % F | ≤ 505 |

Break-Down of Experiment Grading

| | |
|---|---------|
| Notebook (protocol, data, and observations) | 15 pts. |
| Supplement data and question sheets | 20 pts. |
| Additional write-up(calcs. and conclusion) | 15 pts. |

****These values will vary some with each experiment****

All work will be done in the lab notebook.

The above sections will be graded on neatness, content, readability, and spelling. 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 data and observations must be signed by the student and 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 should be recorded in pen and any mistakes written in the notebook should be crossed out with a single line, not a big scribble cloud.

Each section of the notebook should be labeled and in the following order: Title, purpose, reaction (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. 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.

*Calculations, with all the work (formulas used) shown as well as the conclusion section should be done in the lab notebook also. If any instrumental analysis is done (NMR, IR, GC etc.) a data table of results should be included in the notebook. Theoretical yields should be calculated with the actual amount of

starting material used, not the amount listed in the supplement. Significant figure rules apply for all calculations.

* The conclusion section should be done in paragraph form and should contain the following information. State the purpose of 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 1 point per school day for 50 point labs and 2 points per day for 100 point labs.

*Make-up labs are discouraged. In case of emergency, a student may have ONE make-up lab for the semester with the following criteria. Since many of these experiments require more than one week, you must take the make-up lab BEFORE your next lab period. You need to get in direct contact with me within 24 hours after the start of the lab period missed. If you send an E-mail, be sure to include a phone number where you can be reached. If I don't answer my phone, leave a message and your phone number. If you don't hear back from me by Friday at 9:00 a.m. assume I did not get your message and call back. Arrangements for the make-up should be made by the Friday immediately following a missed Thursday lab. A second missed lab will result in a grade of zero for that experiment. More than 1 make-up and 1 missed lab will result in an F for the semester.

*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, will have to use their make-up lab, and if it is already used, will take a zero.

- Students are responsible for reading and understanding all items on the syllabi. Any items not understood must be brought to the attention of the instructor within the first two weeks of class.
- The work you will do in any 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. In accordance with the Code of Student Rights and Responsibilities, faculty members have the right to determine actions to be taken when a student is caught cheating.
- Faculty members reserve the right to dismiss or to have removed a disruptive student from their classrooms.
- 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.

- Because there are usually more students seeking to enroll in laboratories than can be accommodated, students not present for the first meeting of a chemistry laboratory in which they have enrolled may be dropped from the class immediately, unless they have notified the instructor of the chemistry department at 52-5409 of their expected absence. If the lab from which they are withdrawn is a co-requisite for a lecture course, the student will be withdrawn from that lecture also.
- All items on syllabi are subject to change by the instructor.

*Objectives:

- 1) To gain hands on experience in how organic molecules are synthesized.
- 2) To synthesize organic molecules in multiple steps.
- 3) To gain a better understanding of how basic chemistry principles are derived through experimentation.
- 4) To develop skills in reporting organic experimental results.
- 5) To prepare students as best as possible for the future use of their laboratory skills (e.g. chemistry, biochemistry, biology, pharmacology, medical school)