

## Organic Chemistry I (CHEM 235) Syllabus

- Lecture Instructor** Dr. Linfeng Xie (last name pronounced as "Shea")
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e-mail: [xie@uwosh.edu](mailto:xie@uwosh.edu)
- Office Hours** M W F 10:00-11:00 am or by appointment
- Lecture** M W F 11:30 a.m. - 12:30 p.m. HS-
- Lab** Section 1: Monday 1:50-5:10 Section 2: Tuesday 8:00-11:10  
Section 3: Tuesday 1:20-4:30 Section 4: Wednesday 1:50-5:10
- Textbook and Supplies**
- 1) L.G. Wade "Organic Chemistry" with Solutions' Manual, 5th Ed., 2002, Prentice-Hall. (Required)
  - 2) Lecture Notes Outlines (required)
  - 3) Donald Pavia, et. al. "Techniques in the Organic Laboratory", 1st Ed., Harcourt College Publisher, 2002 (required)
  - 4) Organic Chemistry Laboratory Manual for 32-235. (fall 2003, Required)
  - 5) A Bound Lab Notebook. (required, no spiral notebook is acceptable)
  - 6) Darling Molecular Model (Kit-O, required).
- Objectives** To introduce students to the basic principles including:
- 1) Systematic nomenclature of common organic compounds;
  - 2) Physical and chemical properties of organic compounds with different functional groups; relationship between structure and bonding of organic molecules and their chemical properties;
  - 3) Kinetics and thermodynamics of organic reactions and their relationship to reaction mechanisms; use of electron arrow pushing to illustrate reaction mechanisms; and
  - 4) Synthesis of simple organic molecules and introduction of retrosynthesis.

### Evaluation of Student Performance

The grade will be based on 4 hourly exams and the laboratory performance.

- 1) Four hourly exams each worth 100 points will be given during lectures on the dates listed in the lecture schedule on the following page.
- 2) Lab score will be based on weekly lab quizzes and reports, and a laboratory quiz (given at the end of the semester).

	Point Distribution
Hourly exams	4×100= 400
Laboratory	200 (see lab manual)
<b>Total</b>	<b>600 points</b>

The lab will not be graded separately; its score will be included in the total points and the final grade will base on the combined performance. The following is a tentative grade distribution scheme:

A  $\geq$  90% of total points

B  $\geq$  80% of total points

C  $\geq$  70% of total points

D  $\geq$  60% of total points

F < 60% of total points

Check with your instructor regarding your performance as necessary.

### ***Course Policies***

- 1) Four hourly exams will be given during the regularly scheduled lecture time; ***no make-up*** exams will be given for missing the scheduled exam without prior notification. In case of a serious sickness or an emergency, promptly notify the instructor to schedule a make-up if there is evidence of such a sickness or emergency. However, the results of the make-up can only be used as a reference for assigning the final grade (depending upon one's consistent performance in other exams). So please make all your effort to take the ***scheduled*** exams.
- 2) Problem assignments are given in the lecture notes (available in the bookstore), and should be worked out promptly following each lecture. These assignments will not be collected for grading. However, they are ***important*** and can improve your understanding of lecture subjects. Try to work out the problems 2-3 times before consulting the "Solutions Manual".
- 3) The course materials should be studied on a ***regular basis***. Performance can be greatly improved if you study the lecture notes, read the assignments, and work out problems in a ***timely fashion***.
- 4) Students are encouraged to ask questions. Suggestions and comments are always welcome.
- 5) Please note the ***last*** date for adding/dropping this course in the TimeTable.

### **Laboratory**

During the first week, you should read the assigned materials and be prepared for the first experiment to be announced in the lecture. You also need to purchase a pair of safety goggles at the university bookstore. The readings include part of the Pavia's "Techniques in the Organic Laboratory" and the Lab Manual for 32-235. Required readings are listed at the beginning of each experiment under the heading "required reading". You should also read this hand-out carefully for additional information.

Organic laboratory and lecture complement each other. The lecture supplies fundamental theory about molecular and electronic structure, chemical reactions, and their mechanisms. In the laboratory you will put this knowledge into practice and learn supplementary theoretical concepts and mechanisms when necessary to help you more fully understand the chemical process in progress.

The following is a typical procedure you should follow for each laboratory experiment:

1. Prelab: Read each experiment in the lab manual **before** coming to the laboratory. These include the theory involved in each experiment, required reading materials, and the procedure involved in each experiment.
2. Preparation of Notebook: After the above reading, prepare your notebook as described in Chapter 2 of Pavia's techniques book. Your notebook may be **checked** by your instructor at the beginning of each experiment! Points may be deducted for each unprepared notebook writing. The following lists some items to be included in your lab preparation: (items with  $\checkmark$  mark are to be done before each lab and those with  $\bullet$  should be done **during** and after the lab, see entry 4.)
  - $\checkmark$  Page number: print the number consecutively.
  - $\checkmark$  Date: the date when the experiment was performed.
  - $\checkmark$  Title: a brief title of the experiment to be performed.
  - $\checkmark$  Purpose: the purpose of running each experiment (in your own words).
  - $\checkmark$  Main reaction: write the main reaction involved in each experiment where appropriate
  - $\checkmark$  Physical constants of main reagents: list all the **key** reagents in a table format; look up their molecular weight (MW), boiling point if any (b.p.), melting point (m.p.), and density. (These numbers will help you decide, e.g., which layer to take, how hot to heat, what solvent to use, etc.)
  - $\checkmark$  Experimental procedure: list a brief procedure as to how the experiment is to be done. (Be brief and use your own words. DO NOT copy word for word from the Manual) Leave some space for recording observations and comments.
    - $\bullet$  Observations (such as color change, solid formation, gas released, etc.) - **important**
    - $\bullet$  Calculations: list the actual amount of all reagents used; record the weight of products, GC peak area, retention time, m.p., b.p., and **other raw data**. Then calculate moles, limiting reagent, yield, etc.
    - $\bullet$  Conclusion and comments: if you have any comments or conclusions to make in terms of the success or failure of the experiment.
3. Begin the experiment. Discussion of the theory and concepts involved in each experiment will be given by your instructor at the beginning of each lab period. Arrive **on time** for the discussion! Immediately following the discussion, there will be a weekly lab quiz.
4. During the experiment. Record all data and observations in your notebook **while you are working, not after!** Refer to entry 2 above for what to record in the notebook.
5. End of the experiment. Check to make sure chemical wastes are properly disposed of, bench cleaned, all community items returned to their original places.
6. Postlab: Write up the discussion and conclusion part of the experiment in your lab notebook, calculate the yields and work on the lab report. Do them as soon as possible so that the experimental details are still "fresh".
7. Submit your lab report for this lab at the **beginning** of the next experiment.
8. Physical constants can be found in many chemistry handbooks. Here are the two most used ones in this course:

**CRC Handbook of Chemistry and Physics QD 65 .H3**Available at the *Polk Reference Desk* and *Halsey Resource Center Reserve***Aldrich Catalog Handbook of Fine Chemicals**

On reserve at the Halsey Resource Center, and also available in the organic lab.

**Lecture and Exam Schedule (Tentative)**

<u>Week</u>		<u>Topic (# of lectures)</u>	<u>Chapter</u>
1		Introduction and Review (2-3)	1
2		Structure and Properties of Organic Molecules (3)	2
3		Alkanes and Cycloalkanes (3)	3
4		Study of Chemical Reactions (3)	4
5		<i>Exam #1- Sept. 29</i>	
5-6		Stereochemistry (5)	5
7		Substitution and Elimination(4)	6
		<i>Exam #2- Oct. 24</i>	
8		Alkene: Structure & Synthesis (3)	7
9		Reactions of Alkenes (3)	8
10		Alkynes (2-3)	9
		<i>Exam #3- Nov. 19</i>	
11-12		Alcohols: Structure & Synthesis (3)	10
13		Alcohols: Reactions (3)	11
14		<i>Exam #4- Dec. 12</i>	