# Chemistry 356, **Organic Chemistry II**

Course Syllabus (sections 201, 202, CRN 1488, 1489), Spring 2006

**Credits**: 3 **Prerequisite**: C or better in CHM 355 (those registering for a grade without the prerequisite will be assigned a grade of F)
**Instructor**: Dr. Lawrence Schmitz **Office**: 480 Science **Phone**: 696-2373 **email**: schmitz@marshall.edu
**Office Hours**: MWF 1:00 – 2:00, TR: 9:00 – 11:00
**Required Text**: Joseph M. Hornback, **Organic Chemistry 2nd Ed.**, Thomson – Brooks/Cole 2006
**Required Software Access:** A WebAssign Access Code is required to do the required online homework
**Highly Recommended**: Molecular models

## Approximate Lecture and Exam Schedule

| Date | Chapter | Topic |
|---|---|---|
| Jan. 9, 11, 13, 18 | 13 | Infrared Spectroscopy |
| Jan. 20, 23, 25, 27, 30 | 14 | Nuclear Magnetic Resonance Spectroscopy |
| Feb. 1, 3 | 15 | Ultraviolet-Visible Spectroscopy and Mass Spectrometry |
| **Feb. 8** | 1-15 | **EXAM 1** |
| Feb. 6, 10 | 16 | Benzene and Aromatic Compounds |
| Feb. 13, 15, 17, 20, 22 | 17 | Aromatic Substitution Reactions |
| Feb. 24, 27, March 1, 3 | 18 | Additions to the Carbonyl Group: Reactions of Aldehydes and Ketones |
| **March 8** | 1-18 | **EXAM 2** |
| March 6, 10, 13 | 19 | Substitutions at the Carbonyl Group: Carboxylic Acids and Derivatives |
| March 15,17,27,29,31 | 20 | Enolates and Other Carbon Nucleophiles |
| **April 5** | 1-20 | **EXAM 3** |
| April 3, 7, 10 | 21 | The Chemistry of Radicals |
| April 12, 14, 17 | 22 | Pericyclic Reactions |
| **April 17** | 1-22.5 | **EXAM 4 (first half)** |
| April 21, 24, 26, 28 | 23 | The Synthesis of Organic Compounds |
| **April 26** | 1-23 | **EXAM 4 (second half)** |
| **April 29** | 1-23 | **FINAL EXAM** (9:50 am, SATURDAY) |

NOTE: The final exam is a comprehensive exam covering the entire two-semester sequence.

**Course Objectives:**

a. To become familiar with the vocabulary of organic chemistry.
b. To demonstrate mastery of the fundamental concepts of organic chemistry including the structures, reactions, and identification of organic compounds using spectroscopic and chemical techniques.
c. To be able to use the fundamental concepts to solve problems of a routine nature, and also those problems requiring creativity and ingenuity.

**Problems - Homework - WebAssign:**

Working problems is an essential portion of the process of studying organic chemistry. Work all of the problems that are imbedded in the text since these are designed to allow you to test yourself on your understanding of the section(s) just before these problems. Solutions to these problems are included in the text.

In addition, you will be required to complete a series of online homework problems. These problems may be taken from those at the ends of the chapters of your text or from other sources. In either case the answers will not be made available to you until after you have completed the homework. You will be required to complete these assignments in a timely fashion. When each assignment is posted on the web, a due date will be specified.

You will be allowed five attempts to complete the assignment with a score of 80% or higher. If you fail to complete the homework in fives tries, you will be required to see me to receive special help and special homework assignments. **Those students who do not successfully complete the regular or special homework assignments will not be allowed to take the exam on that material and will have a grade of zero assigned on that exam. Students who complete their homework after the due date but before the exam on that material will be penalized two scaled points per assignment on their exam score.** These are serious penalties and failure to do your homework may well result in failing the course. Doing your homework, however, usually results in understanding, and understanding may well allow you to get a high grade in this course.

The online homework will be delivered using software called WebAssign. An access card available from the bookstore or online (https://www.webassign.net/info/purchase.html) is required to use the WebAssign software.

**Conduct of the Course:**

There are four principal tools that you and I will be using to help you learn organic chemistry, your text, web-based homework assignments, and class-time that can be used for either lecture or discussion. As we come to the beginning of each chapter, two things should be happening; first, you should be reading the chapter and working the imbedded problems, and second, I will try to explain the high points of the chapter by lecturing. Organic chemistry is a large and complex subject. I will not be able to cover everything you need to know in lecture. In the lecture portion of the course, I hope to give you an overview of the material to be learned so that you can fill in the rest by reading, working problems and discussion. As discussed in the previous section, you will be required to do a series of homework assignments. It is my hope, that the reading, lecture and homework will allow us to have meaningful discussions of the material. These discussions may take the form of problem solving sessions in which I challenge the class to work significant problems, or it may take the form of a question and answer period in which you challenge me to explain things you want to know or are having trouble understanding.

# Grading Policies

Lawrence R. Schmitz

There will be four exams and a final in this course. You may earn points towards your grade on these exams. If you failed to successfully complete the assigned homework you can lose points. The final exam will be counted as two hour exams and your lowest grade will be dropped in determining your average. Your average score for the course will be calculated as shown below:

Average Score = {Exam1 + Exam2 + Exam3 + Exam4 + [2*(FinalExam)] - LowestExam} / 5.

The "LowestExam" can be one of the hour exams or the final. Note that the final exam will be 1/5 (20%) of your grade if you do poorly on it, but 2/5 (40%) of your grade if you do well. **Attendance at exams is required. Make-up exams will only be given for university excused absences as defined in the catalog.** Any other missed an exam will be your "LowestExam".

My exams tend to vary in degree of difficulty. This can cause problems in determining which exam is indeed your poorest. For example, suppose I give you an exam and that I determine that you need 90% correct to get an A on this exam. Assume that you get 85% correct, a B grade. Suppose that the next exam is much harder than the first. Because of this, I determine that 80% correct is an A. Further suppose that you get 82% correct on this exam, an A grade. The situation is then as shown below:

| Exam | %Correct | Grade |
|---|---|---|
| 1 | 85 | B |
| 2 | 82 | A |

Which exam should be dropped? Obviously, these exams need to be put on a common basis.

Therefore, I have developed a scaling technique to help overcome this problem. The mathematics of this technique is described later. After I apply this technique, you will receive a scaled score. Your average score (as described above) will be determined using the scaled scores from each exam. Your grade for the course will be the highest grade possible based on the criteria below:

| Average Scaled Score | Grade |
|---|---|
| ≥ 90 | A |
| ≥ 80 | B |
| ≥ 70 | C |
| ≥ 60 | D |
| < 60 | F |

# The Mathematics of Scaling

After you are given an exam, I will grade the exams and determine a raw score for each individual in the class. Based on my judgment of the difficulty of the exam and of what level of performance is necessary to receive a given grade, I will determine what is the minimum score necessary to receive an "A" and what score is the minimum "C". If everyone performs exceptionally well, I will be happy to the draw the A line in a position such that everyone will receive an A. At the other extreme, if the performance of all individuals is very poor I will draw the lines in a way that reflects this. Your grades are, therefore, actually determined by my judgment of your performance.

In order for the scaling technique to be in agreement with the 90, 80, 70, 60 grading criteria given above, I make two boundary conditions. The lowest A must scale to a 90 and the lowest C must scale to a 70. My scaling technique is linear and as such is based on the equation for a straight line ($y = mx + b$). In this case the equation is:

$$\text{ScaledScore} = (m * \text{RawScore}) + b$$

where m and b are constants not yet determined. To determine the two scaling constants, I apply the two boundary conditions to yield the following equations:

$$90 = (m * \text{LowestA}) + b$$
$$70 = (m * \text{LowestC}) + b$$

By subtracting the second boundary equation from the first and solving for m, you will see that:

$$m = 20 / (\text{LowestA} - \text{LowestC}).$$

You can then substitute the now known value of m into the first boundary equation to obtain:

$$b = 90 - (m * \text{LowestA}).$$

At this point, your raw score and both m and b are known. Therefore, you can determine your scaled score [ScaledScore = (m * RawScore) + b]. If you have occurred any penalty points for failing to complete your homework on time, they will be subtracted from your scaled score.

When you take an exam, I will do all this math for you. When I return the exam to you, there will be both a raw score and a scaled score on the exam. **It will be very easy to determine how you did on an exam. Just look at the scaled score and remember the 90, 80, 70, 60 grading criteria.** The raw score is there so you can check to see that I added up your score correctly. I will also announce the values of the Lowest A, Lowest C, m and b, so you can check my math if you like. You should also check the grading of each problem and let me know if you have any questions or grievances.