Chemistry 356, **Organic Chemistry II**

Course Syllabus (section 601, CRN 6011, Summer III 2014, 1:00 – 3:00 MTWRF)

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**: Science 480/488 **Phone**: 696-2373 **email**: schmitz@marshall.edu
Office Hours: 12:15 – 12:45, 3:00 – 4:00 MTWRF
Required Text: Thomas N. Sorrell, **Organic Chemistry 2nd Ed.**, University Science Books 2006
Highly Recommended: Molecular models
Course Policies:
This course will be conducted adhering to university policies. Copies of these policies can be found at: http://www.marshall.edu/academic-affairs/policies/. Attendance at exams is required. Make up exams will only be given for university excused absences as defined in the policy.
Catalog Course Description: Organic Chemistry II. 3 hrs. I, II, S. Continuation of Chemistry 355. 3 lec. (PR: C or better in CHM 355)
Course/Learning 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, ingenuity and critical thinking.

Approximate Lecture and Exam Schedule

Date	Chapter	Topic
July 15, 16	14	Section 14.3, Infrared Spectroscopy
July 16, 17, 18	13	Proton and Carbon NMR Spectroscopy
July 21	14	Determining the Structures of Organic Molecules
July 23	1-14	**EXAM 1**
July 22, 23	15	Organometallic Reagents and Chemical Synthesis
July 24, 25	17	The Chemistry of Benzene and its Derivatives
July 28, 29	18	Nucleophilic Addition Reactions of Aldehydes and Ketones
July 31	1-18	**EXAM 2**
July 29, 30, 31	19	Addition-Substitution Reactions of Aldehydes and Ketones…
July 31, Aug. 1	20	Addition-Elimination Reactions of Aldehydes and Ketones
Aug. 4, 5	21	Addition-Elimination Reactions of Carboxylic Acids and Derivatives
Aug. 7	1-21	**EXAM 3**
Aug. 6, 7	22	The Acid-Base Chemistry of Carbonyl Compounds
Aug. 8, 11	23	The Nucleophilic Addition Reactions of Enolate Ions
Aug. 12, 13	24	Conjugate Addition Reactions of Unsaturated Carbonyl Compounds
Aug. 14	1-24	**EXAM 4**
Aug. 15	1-24	**FINAL EXAM**

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

Problems

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. You should try to work all of the problems at the ends of the chapters. Since you will not always have time to do them all, you should try to work at least the ones on the following list. Some of the questions on the four hour exams will be selected from those imbedded in the text and those assigned below.

Chapter	**Problems**
13	15a,c,d,f; 16a,c; 18; 19a,d; 20a,d; 27; 28; 29; 30; 31; 32; 33
14	12; 14; 15; 18; 19; 20; 21; 23; 24; 25
15	18; 20; 22; 23; 25; 26; 31; 32; 34
17	24; 26; 28; 30; 31; 32; 35; 36; 39; 42
18	11; 13; 14; 15; 16; 17; 18; 19; 23
19	22; 27a,d,e,f,i,j; 28
20	21; 24; 28; 29; 30
21	20; 21; 29; 30; 34; 35; 40
22	20; 21; 23; 24; 28; 33; 34; 40
23	17; 18; 20; 21; 24; 28
24	18; 20; 22; 23; 25; 28; 31

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. 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.** A score of zero will be recorded for unexcused missed exams.

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].

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.

The standardized final exam in CHM 356 is scaled based on your percentile rank compared to national norms. >85%ile = A, 65 - 85%ile = B, 35 - 65%ile = C, 15 - 35%ile = D, <15%ile = F.