Chemistry 356, **Organic Chemistry II**, Spring 2018

Course Syllabus (section 202, CRN 2402, 12:30 – 1:45 T,R, Room S-473)

Course Description (CHM 355-356 sequence):
A systematic study of organic chemistry including modern structural theory, spectroscopy, and stereochemistry; application of these topics to the study of reactions and their mechanisms and applications to synthesis.
Catalog Description: 356 Organic Chemistry II. 3 hrs. I, II, S.
Continuation of Chemistry 355. 3 lec. (Prerequisite: C or better in CHM 355)
Instructor: Dr. Lawrence Schmitz **Office**: Science 488 **Phone**: 696-2373 **email**: schmitz@marshall.edu
Office Hours: M,W: 12:30 – 2:00; F: 1:00 – 3:00
Required Text: Organic Chemistry (5th ed.), Janice Gorzynski Smith, McGrawHill, 2017
Addition Required Items: access to Sapling Learning online homework. See: http://www.saplinglearning.com
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.

Approximate Lecture and Exam Schedule

Date	Chapter	Topic
Jan. 9,11,16	13	Mass Spectrometry and Infrared Spectroscopy
Jan. 16,18,22	14	Nuclear Magnetic Resonance Spectroscopy
Jan. 23,25	15	Radical Reactions
Feb. 1	1-15	**EXAM I (emphasizing Chapters 13-15)**
Jan. 30, Feb. 6	16	Conjugation, Resonance and Dienes
Feb. Feb. 6,8	17	Benzene and Aromatic Compounds
Feb. 13,15	18	Reactions of Aromatic Compounds
Feb. 22	1-18	**EXAM II (emphasizing Chapters 16-18)**
Feb. 20,27	19	Carboxylic acids and the Acidity of the O-H
Feb. 27, Mar. 1	20	Introduction to Carbonyl Chemistry; Organometallic Reagents; Oxidation and Reduction
Mar. 6,8,12	21	Aldehydes and Ketones – Nucleophilic Addition
Mar. 15	1-21	**EXAM III (emphasizing Chapters 19-21)**
Mar. 12,27,29	22	Carboxylic Acids and Their Derivatives – Nucleophilic Acyl Substitution
Mar. 29, Apr. 3,5	23	Substitution Reactions of Carbonyl Compounds at the α Carbon
Apr. 10,12	24	Carbonyl Condensation Reactions
Apr. 19	1-24	**EXAM IV (emphasizing Chapters 22-24)**
Apr. 17,24	25	Amines
Apr. 24,26	26	Carbon-Carbon Bond-Forming Reactions in Organic Synthesis
Apr. 28	1-26	**FINAL EXAM (Saturday, 9:50 am)**

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

Course/Learning Objectives:

a. To demonstrate mastery of the fundamental concepts of organic chemistry including knowing the common organic functional groups, being able to name organic compounds, being able to describe and recognize the structure relationships among organic compounds, know the different types of organic reactions, know the reagents used to transform one organic compound to another, know the mechanisms of common organic reactions, be able to propose mechanisms for reactions similar to those you studied, and understand how to use spectroscopic and reactivity data to identify an organic compound.
b. 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.

Practicing to Achieve the Learning Objectives:

In order to obtain the learning objectives, I suggest the following methods:

a. Read the appropriate material in your textbook prior to the material being covered during lecture.
b. Attend the lectures.
c. Work problems to learn and test that you have mastered the material. This would include as a minimum working the problems imbedded in the chapters and doing the assigned online homework. The importance of working problems as a part of learning organic chemistry cannot be overstated. Additional information is provided below. Exam questions will be similar to those in the textbook and on the online homework.
d. Discuss the material and seek help if necessary.

Assessing Your Success in Obtaining the Learning Objectives:

Your success will be evaluated using four exams and a final exam (see Grading Policies).

Problems - Homework - Sapling Learning:

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. The answers to these problems 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 may have unlimited attempts to work each assigned problem. You may get help working the problems. However, you must get 75% of the problems correct by the due date or be penalized on the next exam. For each chapter homework not completed on time you will be penalized 40% of a letter grade on the next hour exam. 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 Sapling Learning. Paying for an access card available from the bookstore separately or bundled with a book or paying online is required to use the system. Here are the instructions from Sapling Learning on how to use the system.

1. Go to http://saplinglearning.com. Click the link titled "How to Create an Account". It will show you to create and login to an account.

Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments. During sign up - and throughout the term - if you have any technical problems or grading issues, send an email to support@saplinglearning.com explaining the issue. The Sapling support team is almost always more able (and faster) to resolve issues than your instructor.

If you have problems understanding the chemistry when doing your homework or when studying, please consult me. I am almost always more able (and faster) to resolve these issues than the Sapling support team.

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.

(Note: Should a scheduling problem require we only have three hour exams, the final will still count twice and your lowest will still be dropped.) 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. Should you fail to complete your homework, the appropriate penalty will be applied to your scaled score (see **Problems - Homework - Sapling Learning)**. 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.