

## Organic Chemistry I

Fall 2013

CHEM 341

Instructor: Bob Miess

Meeting Time: MTWF 11

Lab: Varies at sites

Office: Mayville State University  
Science Building 136

Credits: 4 S.H.

Office Hours: By appointment

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### **Course Description:**

The CHEM 341/342 course sequence is intended to be an introduction to the basic concepts of organic chemistry. In CHEM 341 we will study the chemistry of carbon compounds with an emphasis on bonding description and the relationship to structure and chemical reactivity, stereochemistry, and basic reaction mechanisms. Classes of compounds used to discuss and illustrate these concepts include alkanes, alkenes, alkynes, alcohols, and haloalkanes.

This course is delivered over the NDUS IVN system. Because of the occasional necessity for a student to miss a class for a University approved reason, the lecture will be recorded. By enrolling in this course, you are agreeing to be taped for academic purposes on these occasions. The recordings will be removed from the course web page and deleted at the end of the semester.

### **Purpose:**

The purposes of CHEM 341 include expanding the student's knowledge of chemical principles begun in General Chemistry, introducing the student to the foundations of organic chemistry including the relationship between the chemical and physical properties of a substance to its structure, and developing the laboratory skills to successfully function in an Organic Chemistry laboratory.

Organic chemistry is one of the recognized areas of the chemical universe and can be a daunting challenge because of all the information and skills to be mastered.

Organic chemistry nowadays almost drives me mad. To me, it appears like a primeval tropical forest full of the most remarkable things, a dreadful endless jungle into which one

does not dare enter for there seems to be no way out.  
Friederich Wohler, 1835

### **Course Goals and Objectives:**

The goals of the MSU Science program are to present current information on aspects of the physical world and to develop logical reasoning, sometimes mathematical, relating one process to another. Organic Chemistry prepares the student to explain basic principles of organic chemistry and its relationship to other disciplines as well as to describe different scientific models and how these models are used to stimulate scientific inquiry.

Students who have completed this course should be able to:

1. Name organic compounds.
  - What are the IUPAC rules for naming organic compounds?
  - How does structure affect the naming of organic compounds?
  - How do stereochemical concerns influence the naming of organic compounds?
2. Apply the descriptions of bonding to organic compounds and their reactions.
  - Draw Lewis Dot structures emphasizing the reactivity of a molecule.
  - What does VSEPR tell us about bonding in carbon compounds?
  - How do structure and bonding affect physical properties of organic compounds?
  - Compare and contrast the reactions of propane, propene, and propyne.
3. Discuss several kinds of basic organic reactions. These include nucleophilic substitution, elimination, radical substitution, electrophilic addition, and pericyclic reactions.
  - Compare and contrast SN1, SN2, E1, and E2 reaction mechanisms.
  - What reaction conditions favor substitution over elimination?

### **Assessment:**

The Chemistry Program adopted the following student learning outcomes in Fall 2010. Student learning outcomes are statements of what students should think, know, feel or do when they have completed a program. They are the basis for determining the extent to which program learning goals are being met. They are measurable or identifiable, action-oriented and realistic. Student learning outcomes for other majors can be found on the Moodle course page in the document *MSU Academic Student Learning Outcomes*.

- SLO #1:** Students will acquire a content knowledge base in the traditional chemistry core commensurate with career goals
- SLO #2:** Students will communicate scientific information both orally and in writing
- SLO #3:** Students will apply quantitative or qualitative theories of science to a broad variety of chemical problems (including experiential component)
- SLO #4:** Students will construct and critically analyze scientific arguments

**SLO #5:** Students will integrate technology into their work and their work products

Specific assessment activities have been identified for most required courses in a program. The results of these activities will be gathered and evaluated for use in improving the program.

In CHEM 341 the identified program activities include problem activities related to SLO1, content knowledge, and writing assignments tied to SLO 2, communicating scientific information.

**Course Improvements Based on Most Recent Assessment Findings**

Program Assessment Finding (SLO 1) – students are not retaining content knowledge throughout the year at a rate comparable to their national peers. To address this, the Sapling homework system is being implemented to provide student opportunities to build their skills because of the provided hints and explanations available with each question at a more personalized pace, in an interactive environment, and as a means to provide nearly immediate feedback. The expectation is that average student scores on the American Chemical Society standardized exam (administered as the CHEM 342 final exam) will improve.

Program Assessment Finding (SLO 2) – students are satisfactorily able to orally communicate scientific information; but were weaker in written communication. Assignments have been slightly altered to include additional writing components. The expectation that additional writing practice will lead to improved written communication skills.

**Instructional Strategies:**

Multiple strategies will be utilized during the semester including direct instruction, modeling, cooperative learning, problem-based learning, reflective research, and inquiry.

<b>INTASC Principles</b>	
1	The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he/she teaches and can create learning experiences that make these aspects of subject matter meaningful for the students.
2	The teacher understands how children learn and develop, and can provide learning opportunities that support their intellectual, social, and personal development.
3	The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to the diverse learner.
4	The teacher understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills.
5	The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.
6	The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.

7	The teacher plans instruction based upon knowledge of subject matter, students, the community, and curriculum goals.
8	The teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the learner.
9	The teacher is a reflective practitioner who continually evaluates the effects of his/her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.
10	The teacher fosters relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well-being.

### **Course Requirements:**

#### *Co-Requisites:*

Enrollment in the corresponding laboratory course, CHEM 341L, is required.

#### *Requirements:*

**Organic Chemistry**, 2<sup>nd</sup> Edition (2006), Sorrell TN, University Science Books, Sausalito, CA.

#### Sapling Learning access

1. Go to <http://saplinglearning.com> and click "US Higher Ed" at the top right
- 2a. If you already have a Sapling Learning account, log in then skip to step 3.
- 2b. If you have Facebook account, you can use it to quickly create a SaplingLearning account. Click the blue button with the Facebook symbol on it (just to the left of the username field). The form will auto-fill with information from your Facebook account (you may need to log into Facebook in the popup window first). Choose a password and timezone, accept the site policy agreement, and click "Create my new account". You can then skip to step 3.
- 2c. Otherwise, click "create account". Supply the requested information and click "Create my new account". Check your email (and spam filter) for a message from Sapling Learning and click on the link provided in that email.
3. Find your course in the list (you may need to expand the subject and term categories) and click the link.
4. If your course requires a key code, you will be prompted to enter it.
5. If your course requires payment, select a payment option and following the remaining instructions.

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](mailto:support@saplinglearning.com) explaining the issue. The Sapling support team is almost always more able (and faster) to resolve issues than your instructor.

Internet connectivity to access course materials which will be posted on the Mayville State site using our current learning management system and the electronic homework system, Sapling Learning

*Recommended Text:*

**Solutions to Exercises Organic Chemistry**, 2<sup>nd</sup> Edition (2006), Sorrell TN, University Science Books, Sausalito, CA.

*Student Responsibilities:*

As a student in this class you are expected to:

1. Complete assignments in a timely fashion. Late work is unacceptable and will be graded accordingly.
2. Actively participate in the learning process. In order to participate you need to be prepared so that you can ask and answer questions, draw your own conclusions, and think creatively as well as critically. If you do not understand something, speak out.
3. Take responsibility for the learning experience of yourself and the other members of the class. You can learn a great deal by working with others.
4. Attend all class meetings. Absences not only hurt your learning experience, but that of everyone else in the class. You are an integral part of this class. We need you! If you miss a class with a University approved excuse, you will be allowed to make up any missed work. If class is cancelled at one location because of inclement weather, class is cancelled at all locations. Under such circumstances, please check the class web site for assignments and other important announcements.

*Student Activities:*

Student grades will be based upon your performances in the following areas:

1. Several mastery quizzes, which cover the lecture material under discussion, will be assigned in class. The quizzes are given to ensure that you are keeping up with the reading and more importantly that you understand what we are discussing. The quizzes will be administered electronically and therefore will be available on the moodle class site. You will take the quiz to check your understanding of the material. You will then have the opportunity to re-take the quiz (if you want) to show a better understanding of the material. You will generally have a week to complete this cycle. (INTASC 1, 3, 7, 8)
2. There will be three exams during the semester. These assessments will be designed to address your understanding of the material presented in the text and in class. The exams will generally consist of a section of multiple choice

questions, a section of chemical reactions where you will need to supply the major organic product based on the starting compounds and the reaction conditions, a section requiring you to provide a step-wise flow of electrons describing how a given starting material is converted into a given product, and essay response question(s) where you will be required to apply and synthesize the material that has been presented and discussed in class. (INTASC 3, 7, 8)

3. The Final Exam will be given as an in-class cumulative exam in two parts/days. (INTASC 3, 7, 8)
4. There will be chapter problem assignments that will be discussed in class. Chapter homework exercises will be available via Sapling Learning. Additionally there will be at least one problem set that focuses on applications of the material we are covering. (INTASC 1, 2, 3, 4, 5, 7, 10)
5. Your participation in class will be evaluated and included as part of the grade. Participation includes asking and answering questions, working on in-class assignments, etc. By default – attendance will be monitored; unapproved absences will affect your participation score. (INTASC 1, 2, 3, 4, 5, 6, 8, 10)

### **Course Grading:**

Quizzes	20%	<u>Total Percent</u>	<u>Letter Grade</u>
Examinations	30%	90 – 100%	A
Final Exam	15%	80 – 89.9%	B
Problems	30%	70 – 79.9%	C
Participation	5%	60 – 69.9%	D

### **Bibliography:**

Organic Chemistry, 8<sup>th</sup> Edition, (2011), Carey FA, Guiliano, RM, McGraw-Hill, New York.

Organic Chemistry, 3<sup>rd</sup> Edition, (1973) Morrison, Robert T., Boyd Robert N., Allyn and Bacon, Inc., Boston, M.A.

Organic Chemistry, 5<sup>th</sup> Edition, (2000) McMurry, John, Brooks-Cole Thomson Learning, U.S.

Organic Chemistry, 6<sup>th</sup> Edition, (2006) Wade, Jr. L.G., Pearson Prentice Hall, Upper Saddle River, N.J.

A listing of important University policies related to courses and coursework, Important Student Information, is posted on the class Moodle site

The above schedule and procedures in this course are tentative and subject to change in the event of extenuating circumstances. Prior notice will be given to students in such instances.