



SAINT LOUIS UNIVERSITY  
MADRID

## CHEM 2410 – Organic Chemistry 1

Fall 2017

**Class Days and Time:** MW 14:30 - 15:45

**Classroom:** PAH 24

**Prerequisite(s):** A grade of C- or better in Chem -1120

**Credit(s):** 3

**Lab: 1 credit.** Your lab grade is an entirely separate grade determined by your lab instructor, and it will appear as such on your transcript. **Lab attendance is mandatory, unless excused by illness. Missing more than three labs will be graded as F.**

**Instructor:** Tania de la Fuente

**Instructor's Email:** tania.delafuente@slu.edu

**Instructor's Campus Phone:** 91 554 58 58, ext. 268

**Office:** PAH-204

**Office Hours:** MW 13:00 - 14:00, or by appointment

### **Course Description:**

The science of carbon. Modern organic chemistry of aliphatic compounds. Study of the structure and properties of organic molecules, and transition states, kinetics of reactions and reaction mechanisms: free radical substitution reactions of alkanes, stereochemistry, nucleophilic aliphatic substitution, and reactions of alkenes, alcohols and alkyl halides, electrophilic free radical stereoselective and stereospecific reactions.

### **Course Goals and Student Learning Outcomes:**

#### **Rationale for the Course:**

The study of organic chemistry will ensure a foundation in the structure and properties of the chemistry of carbon compounds and their importance in medicinal chemistry, biochemistry, medicine, environmental chemistry and consumer chemistry.

**Objectives:**

- a. study the structure and properties of organic molecules.
- b. name organic compounds.
- c. identify organic compounds on the basis of experimental data.
- d. suggest reasonable explanations for the outcomes of organic reactions.
- e. learn some of the techniques used for structure determination.

**Chemistry Program Objectives**

- A. Students will identify the principles of modern chemistry and demonstrate their application to a range of common systems. This includes:
  1. Being able to perform quantitative calculations using experimental data.
  2. Explain the physical and chemical properties of substances based on an understanding of atomic, molecular and supermolecular structure.
  3. Connect observations with prior information, this includes prediction and identification of chemical/biochemical reaction products.
- B. Students will connect the theory learned in classes with procedures learned in a laboratory setting.

**Student Learning Outcomes:**

<b>Program Objectives</b>	<b>Student Learning Outcomes</b>	<b>Assessment Method</b>
A	<ol style="list-style-type: none"><li>1. Identify the various organic functional groups present in the structure of an organic molecule.</li><li>2. Give the correct name of an organic compound when provided the structure of the compound, and give the correct structure of a compound when provided the name.</li><li>3. • Illustrate basic concepts of structure and bonding in organic compounds, including constitutional isomerism, stereoisomerism, conformational analysis, and structural effects on the physical and chemical properties of organic compounds.</li><li>4. Illustrate basic concepts relating to reactivity of organic compounds.</li><li>5. Predict the product(s) of an organic reaction(s) consisting of one or several</li></ol>	Exams, quizzes, homework and Final exam

	<p>steps, correctly taking into account aspects of stereo-, regio-, and chemoselectivity.</p> <p>6. Analyze spectroscopic data (IR, MS, and <sup>1</sup>H-NMR) in order to elucidate the correct structure of a molecule, including being able to assign correctly various spectral attributes and features to a particular portion of a molecule's structure.</p>	
B	Connect the theory with the lab procedures	Exams, quizzes, homework and Final exam

Saint Louis University - Madrid Campus is committed to excellent and innovative educational practices. In order to maintain quality academic offerings and to conform to relevant accreditation requirements, the Campus regularly assesses its teaching, services, and programs for evidence of student learning outcomes achievement. For this purpose anonymized representative examples of student work from all courses and programs is kept on file, such as assignments, papers, exams, portfolios, and results from student surveys, focus groups, and reflective exercises. *Thus, copies of student work for this course, including written assignments, in-class exercises, and exams may be kept on file for institutional research, assessment and accreditation purposes.* If students prefer that Saint Louis University - Madrid Campus does not keep their work on file, they need to communicate their decision in writing to the professor.

### **Required Texts and Materials:**

Textbook: Organic Chemistry by McMurry.

Lab Manual: Principles of Organic Chemistry I, CHEM-2415

Molecular Model kit (optional)

### **Attendance Policy:**

You are expected to attend all classes. Most students in the past have found the lectures to be helpful. If you absolutely must miss a class, it is your responsibility to get all information and material covered from your fellow students.

Students who legitimately miss an exam, due to a doctor's visit or family emergency **must provide written documentation** of the circumstances, and will be allowed to take a make-up exam. A letter from the university counselor is accepted. Exams that are missed illegitimately result in a score of F. Grades for these students will be based on the remaining exams. Missing more than one exam will result in an F final grade.

**End of Semester Travel Plans:** **DO NOT** make plans to leave SLU before the last day of the final exams. Tell your parents **NOT** to make reservations before that date. If plans have already been made, *change them now!!*

**Course Requirements and Grading Rationale/System:**

First Exam: 20%

Second Exam: 20%

Final Exam: 30%

Homework: 20%

Quizzes: 10%

**Fall Course Content:**

1. Structure and Bonding, Chapter 1
2. Polar Covalent Bonds, Acids and Bases, Chapter 2
3. Organic Compounds: Alkanes and their stereochemistry, Chapter 3
4. Organic Compounds: Cycloalkanes and their stereochemistry, Chapter 4
5. Stereochemistry at tetrahedral centers, Chapter 5
6. Alkenes, Chapters 7 & 8
7. Alkynes, Chapter 9
8. Organohalides, Chapter 10
9. Nucleophilic Substitutions and Eliminations, Chapter 11
10. Structure Determination: MS, IR and NMR, Chapters 12 and 13

Any information on changes regarding the course content will be communicated to students in advance.

<b>Week</b>	<b>Topic</b>	<b>Chapter</b>
1	Structure and Bonding	1
2	Structure and Bonding	1
3	Polar Covalent Bonds, Acids and Bases	2
	Last day to drop without a W and choose AU or P/NP options <b>September 17</b>	
4	Organic Compounds: Alkanes and Cycloalkanes	3
5	Organic Compounds Cycloalkanes	4
6	<b>First Exam October 9</b>	
6	<b>No Classes — October 12-13</b>	

7	Stereochemistry	5
7 & 8	Stereochemistry	5
9	Alkenes	7 & 8
	Last day to Drop a class with a W <b>October 30</b>	
10	Alkenes	7 & 8
	<b>Second Exam November 6</b>	
10	<b>No Classes — November 9</b>	
11	Alkynes	9
12	Alkynes	9
13	Organohalides	10
14	Nucleophilic Substitutions and Eliminations	11
14	<b>No Classes — December 6 &amp; 8</b>	
15	Structure Determination: MS, IR and NMR	12 & 13
	<i><b>FINAL EXAM DECEMBER 14, at 15:30-18:30</b></i>	

### Quizzes and Homework:

Working problems outside of class are an important and expected activity in the mastery of organic chemistry. Occasional quizzes may be given in class and will count towards your final grade.

Regular homework assignments will be given. You are expected to do the assigned problems on your own and they are closed-book and closed-notes. These will count toward your final grade. Your cumulative homework grades will be the tipping scale of your final grade. The purpose of homework is to help you learn, and provides a measure of how you are progressing as the material is being covered.

### Midterms and Final Exams:

There will be two midterms and one written final examination, spaced approximately equally throughout the semester. As the material in organic chemistry builds on that which has been previously covered, **each exam will be cumulative from the beginning of the semester** (*i.e.*, Exam #1 covers Chapters 1 - 3, Exam #2 covers Chapters 1 - 7, *etc.*), although the emphasis will be on material presented since the previous

Midterm. **The final exam is cumulative over material from the entire semester.** The material on the midterms and final examination may be taken from your textbook, lecture notes and/or handouts in class, problems worked in class, and/or homework assignments.

**Examination Dates:**

Exam #1 – Monday, October 9<sup>th</sup> (during class hour)

Exam #2 – Monday, November 6<sup>th</sup> (during class hour)

Final Exam –Thursday, December 14<sup>th</sup> (15:30 – 18:30)

**Grading scale:**

100% < A < 93%

92% < A- < 90%

90% < B+ < 87%

86% < B < 83%

82% < B- < 80%

79% < C+ < 77%

76% < C < 73%

72% < C- < 70%

69% < D < 60%

F < 60%

**E-mail:** Campus and course announcements will often be handled by e-mail. Students should check their “@slu.edu” e-mail regularly.

**University Statement on Academic Integrity:** Academic integrity is honest, truthful and responsible conduct in all academic endeavors. The mission of Saint Louis University is "the pursuit of truth for the greater glory of God and for the service of humanity." Accordingly, all acts of falsehood demean and compromise the corporate endeavors of teaching, research, health care and community service via which SLU embodies its mission. The University strives to prepare students for lives of personal and professional integrity, and therefore regards all breaches of academic integrity as matters of serious concern.

The governing University-level Academic Integrity Policy can be accessed on the Provost's Office [website](http://www.slu.edu/madrid/academics). Additionally, SLU-Madrid has posted its academic integrity policy online: <http://www.slu.edu/madrid/academics>. As a member of the University community, you are expected to know and abide by these policies, which detail definitions of violations, processes for reporting

violations, sanctions and appeals.

The professor will review these matters during the first weeks of the term. Please direct questions about any facet of academic integrity to your faculty, the chair of the department of your academic program or the Academic Dean of the Madrid Campus.

**University Title IX Statement:** Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination, and harassment. If you have encountered any form of sexual misconduct (e.g. sexual assault, sexual harassment, stalking, domestic or dating violence), we encourage you to report this to the University. If you speak with a faculty member about an incident of misconduct, that faculty member must notify SLU's Title IX deputy coordinator, Marta Maruri, whose office is located on the ground floor of Padre Rubio Hall, Avenida del Valle, 28 (mmaruri@slu.edu; 915-54-5858, ext. 213) and share the basic fact of your experience with her. The Title IX deputy coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

If you wish to speak with a confidential source, you may contact the counselors at the SLU-Madrid's Counseling Services on the third floor of San Ignacio Hall (counselingcenter-madrid@slu.edu; 915-54-5858, ext. 230) or Sinews Multipletherapy Institute, the off-campus provider of counseling services for SLU-Madrid (www.sinews.es; 917-00-1979). To view SLU-Madrid's sexual misconduct policy and for resources, please visit the following web address: <http://www.slu.edu/Documents/Madrid/campus-life/SLUMadridSexualMisconductPolicy.pdf>.

**Students with Special Needs:** In recognition that people learn in a variety of ways and that learning is influenced by multiple factors (e.g., prior experience, study skills, learning disability), resources to support student success are available on campus. Students who think they might benefit from these resources can find out more about:

- Course-level support (e.g., faculty member, departmental resources, etc.) by asking your course instructor.
- University-level support (e.g., tutoring/writing services, Disability Services) by visiting the Academic Dean's Office (San Ignacio Hall) or by going to <https://www.slu.edu/madrid/academics/student-resources>.

Students with a documented disability who wish to request academic accommodations must contact Disability Services to discuss accommodation requests and eligibility requirements. Once successfully registered, the student also must notify the course instructor that they wish to access accommodations in the course. Please contact Disability Services at disabilityservices-madrid@slu.edu or +915 54 58 58, ext. 230 for an appointment. Confidentiality will be observed in all inquiries. Once approved, information about the student's eligibility for academic accommodations will be shared with course instructors via email from Disability Services. For more information about academic accommodations, see "Student Resources" on the SLU-Madrid webpage.

Note: Students who do not have a documented disability but who think they may have one are encouraged to contact Disability Services.

**Fall 2017 Course Schedule:**

Monday, September 4	Fall 2017 first day of classes
Sunday, September 17	Last Day to Drop a Class Without a Grade of W and /or Add a Class, choose Audit (AU) or Satisfactory/Unsatisfactory (S/U) Options
Thursday, October 12	Fall Break
Friday, October 13	
Saturday, October 14	
Sunday, October 15	
Thursday, October 19	Midterm Grades Due.
Monday, October 30	Last Day to Drop a Class and Receive the Grade of W.
Wednesday, November 1	University Closed
Thursday, November 2	Spring Registration Opens!
Thursday, November 9	University Closed
Wednesday, December 6	University Closed
Friday, December 8	University Closed
Thursday, December 14	Final Exam – Day 1
Friday, December 15	Final Exam – Day 2
Monday, December 18	Final Exam – Day 3 Midyear Commencement!
Tuesday, December 19	Final Exam – Day 4
Wednesday, December 20	Final Exam – Day 5
Saturday, December 23	Grades Due to Registrar

**FALL 2017 FINAL EXAM SCHEDULE**

	<b>14 Dec (Th)</b>	<b>15 Dec (Fr)</b>	<b>18 Dec (Mn)</b>	<b>19 Dec (Tu)</b>	<b>20 Dec (Wd)</b>
<b>08:30-11:30</b>	Mn classes that meet at 9:00 & 9:30	Mn classes that meet at 10:00	Mn classes that meet at 11:00 & 11:30	Tu classes that meet at 9:30 & 10:00	Tu classes that meet at 8:00
<b>12:00-15:00</b>	Tu classes that meet at 11:00	Mn classes that meet at 13:00	Tu classes that meet at 14:30	Mn classes that meet at 12:00	Tu classes that meet at 12:30
<b>15:30-18:30</b>	Mn classes that meet at 14:30	Tu classes that meet at 17:00 & 17:30	Mn classes that meet at 16:00	Tu classes that meet at 15:30 & 16:00	Mn classes that meet at 17:30
<b>19:00-22:00</b>	---	---	Mn classes that meet at 19:00	Tu classes that meet at 19:00	---

### How to succeed in this course:

1. Do not take more than two science classes during the semester(s) you take organic chemistry.
2. Develop a good attitude. Organic chemistry can be both fun and interesting if you allow it to be.
3. Come to class every day, stay alert, and take good notes. Write, write, write....!!!!
4. **Read the assigned material before each class, read it again after each class, and read it a at least the third time before the examination.**
5. **Chapter Exercises: You will be responsible for understanding the problems at the ends of the chapters that have the answers in the back of the book.**
6. Form a study group with a few classmates and work problems together if you wish.
7. Complete the assigned lab activities.
8. **Get help EARLY with concepts you don't understand.** Ask a classmate, ask a chemistry major who has already had the class, but I would prefer if you would ask me first either during office hours, study sessions, or even lab if time allows.
9. If you still need additional help, see me for suggestions of names of chemistry majors who may be interested in tutoring.
10. **The pace of this course is rapid. Stay current with the material and DO NOT get behind.**
11. **The average student should spend about eleven hours per week studying for this course** (for example, one hour each weeknight, three hours each Saturday, and three hours each Sunday).
12. **Daily study is more important than the total number of hours spent weekly.** Historically, students who have postponed daily studying in an attempt to "cram" in the material solely on the weekends have not done well in this course.
13. If you are having difficulty understanding a concept described by McMurry, sometimes studying a different author's interpretation can make all the difference in helping you to understand. You may choose to utilize other organic textbooks (on reserve at the circulation desk in the Library) for extra problems or to read a different perspective on a difficult topic.
14. Utilize the many available Internet web resources and on-line tutorials, such as:  
<http://www.prenhall.com/wade/> (associated with your Wade textbook)  
  
<http://www.brunel.ac.uk/depts/chem/definit.htm> (definitions and terminology)  
  
<http://www.acdlabs.com/iupac/nomenclature> (IUPAC rules for nomenclature)  
  
<http://www.abdn.ac.uk/curly-arrows> (good practice for writing mechanisms)  
  
<http://www.towson.edu/~sweeting/orgrxs/reactsum.htm> (organic reaction quizzes)