

## CHEM 725\_Advanced Organic Chemistry

### Meeting Information:

<b>Lecture Days:</b>	MW
<b>Lecture Times and Locations:</b>	17:30 – 18:45 in CHE 102
<b>First and Last Days of Lecture:</b>	Wednesday, January 21 and Wednesday, May 6
<b>Exam 1:</b>	Wednesday, March 4 (17:30 – 19:30) in CHE 102
<b>Exam 2:</b>	Wednesday, April 8 (17:30 – 19:30) in CHE 102
<b>Final Exam:</b>	Wednesday, May 13 (17:30 – 19:30) in CHE 102

### Course Descriptions:

CHEM 725 focuses on advanced study of structures and reactions of organic compounds. Reactive intermediates, reaction mechanism, stereochemistry and asymmetric synthesis will be discussed in this course.

### Learning Outcomes:

Students will be able to explain the difference of chemical reactivity of organic molecules based on bonding theory, Frontier Molecular Orbital theory, and stereoelectronic effects. Further more, students will be able to predict organic reaction mechanisms by applying the pushing electrons in a wide range of organic reactions such as nucleophilic substitution reactions, addition / elimination reactions, pericyclic reactions, aromatic substitution reactions, and radical reactions. Finally, students will be able to demonstrate organic synthesis of small molecules.

### Resources and Materials:

Advanced Organic Chemistry, Fifth Edition - Part A: Structure and Mechanisms, by Francis A. Carey and Richard J. Sundberg. Springer: New York, 2007. ISBN-13: 978-0387683461 <i>downloadable as E-book from the library.</i>	<b>Required</b>
Strategic Applications of Named Reactions in Organic Synthesis, by Laszlo Kurti, Barbara Czako. Elsevier: Boston, 2005. ISBN-13: 978-0124297852.	<b>Required</b>
Organic Chemistry, Second edition: Jonathan Clayden, Nick Greeves and Stuart Warren: Oxford University Press, USA, 2012. ISBN-13: 978-0199270293.	<b>Optional</b>

### Midterm Examinations:

Two midterm exams (**Exam 1 on Wednesday, March 4, 17:30 – 19:30**; and **Exam 2 on Wednesday, April 8, 17:30 – 19:30**) will be administered during class. These exams are 120 minutes long. Because exams are promptly marked and returned to the students, no make-up exams can be administered. A missed exam will receive a score of zero.

### Final Examination:

The final exam will be administered on **Wednesday, May 13, 17:30 – 19:30**. Please be on time. A late student may disturb the other students. The final exam is comprehensive. A missed final exam will receive a score of zero.

### Exam Supplies:

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You must bring your UNLV identification card to the exam and present it to the instructor upon completion of the exam. If you bring notes, papers, or books to the exam, place them in a sealed pack and place the pack at the front of the classroom. All audio devices, including CD/MP3 players and mobile telephones, must be turned off and put away during the exam.

### Evaluation:

	Maximum Points
Midterm Examination 1	100
Midterm Examination 2	100
Final Examination	150
Problem Sets	80
<b>Final Score</b>	<b>430</b>

Course grades are based on your overall score according to the following:

Letter Grade	Minimum Score Needed out of 430	Corresponding Percentage
A	396	92%
A-	387	90%
B+	378	88%
B	353	82%
B-	344	80%
C+	335	78%
C	310	72%
C-	301	70%
D+	292	68%
D	267	62%
D-	258	60%
F	less than 258	<60%

### Course Policies:

This course is mainly based on lecture material. The textbooks are provided as a learning resource and for practice problems. Attendance is mandatory and students are responsible for all

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lecture material missed for any reason. **The instructor will not give MAKE-UP LECTURES during office hours.**

### **Problem Sets:**

Eight problems sets will be given throughout the semester. You are encouraged to work with your fellow students to answer the questions but you should have your own answers. The problem set schedule is shown below:

<b>Problem Set</b>	<b>Out</b>	<b>Due</b>
1	Jan. 26	Feb. 02
2	Feb. 11	Feb. 23
3	Feb. 25	Mar. 09
4	Mar. 11	Mar. 18
5	Mar. 23	Apr. 06
6	Apr. 13	Apr. 20
7	Apr. 22	Apr. 29
8	Apr. 29	May. 06

### **Academic Misconduct:**

Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the Student Academic Misconduct Policy (approved December 9, 2005) located at: <https://www.unlv.edu/studentconduct/student-conduct>.

### **Copyright:**

The University requires all members of the University Community to familiarize themselves **with** and to follow copyright and fair use requirements. **You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws.** Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: <http://www.unlv.edu/provost/copyright>.

### **Disability Resource Center (DRC):**

The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

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### **Religious Holidays Policy:**

Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

### **Transparency in Learning and Teaching:**

The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:

<https://www.unlv.edu/provost/teachingandlearning>

<https://www.unlv.edu/provost/transparency>

### **Incomplete Grades:**

The grade of I—Incomplete—can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

### **Tutoring and Coaching:**

The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call 702-895- 3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

### **UNLV Writing Center:**

One-on- one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>.

### **Rebelmail:**

By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university.

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Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. **Emailing within WebCampus is acceptable.**

### Library Resources:

Students may consult with a librarian on research needs. For this class, the subject librarian is [https://www.library.unlv.edu/contact/librarians\\_by\\_subject](https://www.library.unlv.edu/contact/librarians_by_subject). UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu/>.

### Final Examinations:

The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>.

**Tentative Course Outline:** Subject to change

Day	Date	Topic	Lecture	Required Reading (Chapters) /Problem Sets
Wed	Jan 21	Class Overview: Basic Structure & Bonding	Lecture 1	Ch.1
Mon	Jan 26	Basic Structure & Bonding	Lecture 2	Ch.1/ PS-1 out
Wed	Jan 28	Basic Structure & Bonding	Lecture 3	Ch.1
Mon	Feb 2	Stereochemistry	Lecture 4	Ch.2 / PS-1 due
Wed	Feb 4	Conformation and Stereoelectronic Effects	Lecture 5	Ch.2
Mon	Feb 9	Conformation and Stereoelectronic Effects	Lecture 6	Ch.2
Wed	Feb 11	Conformation and Stereoelectronic Effects	Lecture 7	Ch.2 / PS-2 out
Mon	Feb 16	<b>Washington's Birthday Recess</b>		
Wed	Feb 18	Conformation and Stereoelectronic Effects	Lecture 8	Ch.2
Mon	Feb 23	Pushing Electrons	Lecture 9	Ch.4 / PS-2 due
Wed	Feb 25	Nucleophilic Substitution	Lecture 10	Ch.4 / PS-3 out
Mon	Mar 2	Nucleophilic Substitution	Lecture 11	Ch.4
Wed	Mar 4	<b>Exam 1, 17:30 – 19:30</b>		
Mon	Mar 9	Acid-base Chemistry	Lecture 12	Ch.5 / PS-3 due
Wed	Mar 11	Addition and Elimination reactions	Lecture 13	Ch.5 / PS-4 out
Mon	Mar 16	Addition and Elimination reactions	Lecture 14	Ch.5
Wed	Mar 18	<b>Baldwin's Rules</b>	Lecture 15	Ch.10 / PS-4 due
Mon	Mar 23	Pericyclic Reactions	Lecture 16	Ch.10 / PS-5 out
Wed	Mar 25	Pericyclic Reactions	Lecture 17	Ch.10
Mon	Mar 30	<i>Spring Break</i>		
Wed	Apr 1	<i>Spring Break</i>		
Mon	Apr 6	Pericyclic Reactions	Lecture 18	Ch.10 / PS-5 due
Wed	Apr 8	<b>Exam 2, 17:30 – 19:30</b>		
Mon	Apr 13	Aromaticity and Aromatic Substitution	Lecture 19	Ch.8-9 / PS-6 out
Wed	Apr 15	Aromaticity and Aromatic Substitution	Lecture 20	Ch.8-9
Mon	Apr 20	Reactive Intermediates	Lecture 21	Ch.6 / PS-6 due
Wed	Apr 22	Reactive Intermediates	Lecture 22	Ch.6 / PS-7 out
Mon	Apr 27	Radical Reactions	Lecture 23	Ch.11
Wed	Apr 29	Radical Reactions	Lecture 24	Ch.11 / PS-7 due / PS-8 out
Mon	May 4	Asymmetric Synthesis	Lecture 25	Organic Chemistry (Ch. 45)
Wed	May 6	Asymmetric Synthesis	Lecture 26	Organic Chemistry (Ch. 45) PS-8 due

Wed	May 13	<b>Final Exam, 17:30 – 19:30</b>		
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