SOUTHERN CONNECTCUT STATE UNIVERSITY

Course Number and Title CHE 261 Organic Chemistry II
Spring 20xx

Name: **Office** **Phone:** **E-mail:**	**Office Hours:**

COURSE NUMBER 261 **CREDIT HOURS**: 4 **PREREQUISITES: CHE 260**

COURSE TITLE: Organic Chemistry II

COURSE DESCRIPTION:
The course is a continuation from the first semester course (CHE 260). This course will build on the knowledge gained in that course, and continue with learning additional reactions, as well as detailed mechanisms for additional classes of compounds. In addition, these concepts will be applied through the laboratory portion of the course. The laboratory portion will continue to teach proper and safe techniques, as well as emphasize the development of scientific writing skills using formal lab reports. Furthermore, the use of current organic instrumentation such as nuclear magnetic resonance spectroscopy, infrared spectroscopy, gas chromatography, mass spectrometry, and ultra violet spectroscopy will be a major focus of the laboratory component, as well as the lecture component.

Expected Student Activity	**Average estimated weekly hours needed for each activity**	**Estimated semester (14 weeks) hours needed for each activity**
lecture (contact hours)	3	42
laboratory time (contact hours)	4	56 (11 experiments plus 1 hour for check-in and check-out)
study time	5.5	77
take-home assignments	0.5	7
lab reports preparation	4	56 (11 reports)
final exam		2
Total	17	240

Note: these times are only estimates based on the Department of Education's definition of a credit hour and do not guarantee a specific grade in the course. Students may find that they require more or less time to succeed in the course.

COURSE'S CONTRIBUTION:
This is the second of a two course sequence in organic chemistry that chemistry and pre-med students are required to take. The course will emphasize active understanding of the material and not just rote memorization. The other component of learning that will be emphasized is problem solving. Applications of certain concepts will be related to everyday uses.

LEARNER OUTCOMES & ASSESSMENT

• Learn about nucleophilic substitution and elimination reactions. Students will be expected to be able to discuss concepts and answer questions on exams and problem sets as well as apply these concepts to a laboratory experiment and properly interpret the results on written lab reports. Students will be able to analyze reaction conditions that favor each reaction as well as understand the mechanistic principles of each of the four reactions. (NSTA 1, 5; INTASC 1)

• Learn the reactivity and use of alcohols and ethers. Students will be expected to be able to predict the outcomes of these reactions (carbonyl reduction, Grignard addition to carbonyls, conversion to alkyl halides, eliminations, oxidations, and protecting groups) based on reaction conditions. Students should also be able to discuss mechanistic details and use these reactions is synthetic schemes in order to answer questions on exams and problem sets as well as apply these concepts to a laboratory experiment and properly interpret the results on written lab reports. (NSTA 1, 5; INTASC 1)

• Students will continue to learn about the acquisition and interpretation of various types of spectra important to organic chemistry. These may include but are not limited to NMR (nuclear magnetic resonance spectroscopy), IR (infrared spectroscopy), and mass spectrometry. Students are expected to be able to correctly interpret spectra taken from the products of experiments and use these analyses to understand the results of their experiments and explain these analyses in written lab reports. (INTASC 1, 4; NSTA 1, 3, 4, 5)

• Continue to apply the concepts of conformational analysis and stereochemistry and their importance to reactions in organic chemistry. Students will be expected to be able to correctly show the application of stereochemistry in various reaction outcomes and reaction mechanisms on problem sets and exams. (INTASC 3, 4; NSTA 1, 3, 4, 5)

• Understand the nomenclature of carbonyl containing compounds. Students will be expected to be able to name organic molecules given structures or convert given names into structures in questions on exams and problem sets (NSTA 1; INTASC 1)

• Understand the structural properties of carbonyl containing compounds that makes them important reactants in organic synthesis. Students will be expected identify these properties and compare different carbonyl compounds for reactivity (NSTA 1; INTASC 1)

• Understand the reactions of carbonyl containing compounds (nucleophilic addition to carbonyls, nucleophilic acyl substitution, and carbonyl condensation reactions) that makes them important reactants in organic synthesis. Students will be expected be able to predict the outcomes of these reactions as well as show a full understanding of their reactions mechanisms. Students will also be expected to be able to use the reactions in synthetic schemes. (NSTA 1; INTASC 1)

• Learn about aromaticity and its significance in organic chemistry. Students will be expected to be able to understand the reasoning behind aromatic stability as well as be able to distinguish between aromatic and antiaromatic systems. (NSTA 1; INTASC 1)

• Understand the reactions of aromatic compounds. Students will be expected to be able to discuss the basic electrophilic aromatic substitution mechanism as well as apply it to specific reactions. Students will be expected be able to predict the outcomes of these reactions as well as show a full understanding of their reactions mechanisms. Students will also be expected to be able to use the reactions in synthetic schemes. Students will also apply these concepts to a laboratory experiment and properly interpret the results on written lab reports. (NSTA 1; INTASC 1)

• Learn about amines and their reactivity. Students will be expected to be able to discuss the basic reactions of amines. Students will be expected be able to predict the outcomes of these reactions as well as show a full understanding of their reactions mechanisms. Students will also be expected to be able to use the reactions in synthetic schemes. (NSTA 1; INTASC 1)

• Continue to develop the organic laboratory techniques such as recrystallization, melting points, extraction, distillation, and chromatography learned in CHE 260. Students will be expected in lab to continue using the techniques that they previously learned and will be evaluated by quizzes and written lab reports. (NSTA 1, 2, 3, 6, 9; INTASC 1)

• Carry out some of the reactions from the lecture component of the course in the laboratory. Students will be evaluated on the basis of prelab quizzes to demonstrate their preparation as well as their understanding of these reactions. Students will also be expected to analyze the results of their experiments through various spectroscopic techniques and discuss these in written lab reports. Students will also be expected to show how these concepts relate to the material learned in the lecture. (NSTA 1, 2, 3, 6, 9; INTASC 1)

• Continue development of proper scientific writing style through the use of formal and informal laboratory reports. Students will be expected to write both formal and informal lab reports as well as revise formal lab reports to improve on their writing skills. Students will be expected to write syllabi according to proper

scientific writing (ACS) guidelines as well as the criteria in their laboratory syllabus. (NSTA 1, 2, 3, 4, 6, 8, 9, 10)

• Continue to learn safe laboratory practices in working with organic chemicals. Students will demonstrate through lab quizzes, lab reports, and proper keeping of a lab notebook based on the examples in their lab manual as well as the requirements given in the course syllabus. (NSTA 9) (NSTA 9)

• Learn to give an oral presentation related to their work. Students will be evaluated during an oral presentation at the end of the semester based on one of their laboratory experiments. (NSTA 1, 2, 5, 10; INTASC 1,6)

MODES OF LEARNING

Lectures, demonstrations, assigned problems, in-class group assignments, and quizzes will be all used during the lecture component of the course. Furthermore, the laboratory experiments and hands-on instrumental use will serve to reinforce concepts learned during the lecture. In addition, important techniques used by organic chemists will be learned along with safety issues. Students are expected to perform all of their experiments and receive a passing grade of > 60% in the laboratory component in order to pass the course.

COURSE CONTENT OUTLINE	Topic	Assigned Reading
Lectures 1 – 6	Nucleophilic Substitution and Elimination Reactions	Chapter 11
Lectures 7 – 10	Alcohols and Phenols	Chapter 17
Lecture 11	**EXAM 1**	
Lecture 12	Ethers and Epoxides; Thiols and Sulfates	Chapter 18
Lectures 13 – 16	Aldehydes and Ketones: Nucleophilic Addition	Chapter 19
Lecture 17 – 18	Carboxylic Acids and Nitriles	Chapter 20
Lecture 19 – 22	Carboxylic Acid Derivatives	Chapter 21
Lecture 23	**EXAM 2**	
Lectures 24 – 26	α-Substitu ion of Carbonyl Compounds	Chapt r 22
Lectures 27 – 29	Carbonyl Condensation Reactions	Chapter 23
Lecture 30	**EXAM 3**	
Lectures 31 – 32	Benzene and Aromaticity	Chapter 15
Lectures 33 – 35	Electrophilic Aromatic Substitution	Chapter 16
Lecture 36 – 37	Amines and Heterocycles	Chapter 24
Lecture 38	**EXAM 4**	
Lectures 39 – 40	Pericyclic Reactions	Chapter 30

REQUIRED TEXTS

- McMurray, J. *Organic Chemistry, 7th ed. with CengageNOW*, 2008, Brooks/Cole Publisher.
- Pavia, D. *Introduction to Organic Laboratory Techniques: a Microscale Approach*, 4th ed.
- Molecular Model Kit (two options available in the bookstore).
- Goggles (available from chemistry club).
- Hardcover Lab Notebook.

COURSE REQUIREMENTS

Exams:

The exams will be taken during regular class time. Students who arrive late will not be allotted extra time. Any changes will be announced in class. Only students with valid (documented) excuses will be permitted to take a make-up exam or quiz. Conflicts in scheduling should be resolved in advance (at least one week before the exam). All exams will be comprehensive written tests, but they will concentrate on the material covered since the previous

test. They will be constructed in such a way as to emphasize active understanding of the material. Books, scratch paper (other than furnished), cell phones (and similar electric devices), and calculators will not be allowed.

Attendance: Regular attendance of scheduled classes and laboratory sessions is necessary for academic success. Although I do not take attendance in lecture, lecture attendance is strongly recommended. Lab attendance is required.

Academic Integrity:
All forms of academic dishonesty will not be tolerated. Such infractions are considered cause, at the least, for awarding a **grade of "0"** on the assignment or exam in question. Cheating on an exam may result in failure of the course. For more details, see the student handbook on the subject. This policy will be *strictly* enforced.

Assigned Problems:

1. **Nucleophilic substitutions and eliminations**

Sections covered: Chapter 11
Recommended problems: 25, 26, 27, 29, 30, 31, 34, 35, 36, 37, 38, 41, 42, 43, 47, 49, 51, 57, 61, 62, 65, 67

2. **Alcohols & Phenols**

Sections covered: Chapter 17
Recommended problems: 6, 7, 8, 9, 10, 12, 13, 14, 15, 22, 23, 30, 31, 33, 34, 36, 38, 39, 40, 41, 48, 49, 50, 54, 57, 67

3. **Ethers and Epoxides; Thiols and Sulfates**

Sections covered: Chapter 18
Recommended problems: 2, 3, 5, 7, 10, 14, 17, 26, 29, 35, 37, 39, 43, 51, 57

4. **Aldehydes and Ketones: Nucleophilic Addition**

Sections covered: Chapter 19
Recommended problems: 3, 4, 5, 8, 9, 10, 14, 16, 17, 22, 23, 35, 36, 37, 39, 40, 42, 47, 48, 50, 65, 69

5. **Carboxylic Acids and Nitriles**

Sections covered: Chapter 20
Recommended problems: 6, 10, 11, 13, 25, 26, 28, 36, 38, 52, 57, 59

6. **Carboxylic Acid Derivatives**

Sections covered: Chapter 21
Recommended problems: 4, 5, 7, 11, 17, 18, 19, 23, 35, 36, 37, 40, 44, 47, 64, 68

7. **α-Substitution of Carbonyl Compounds**

Sections covered: Chapter 22
Recommended problems: 1, 4, 7, 8, 13, 16, 20, 22, 23, 25, 27, 30, 31, 35, 36, 41, 44, 47, 52

8. **Carbonyl Condensation Reactions**

Sections covered: Chapter 23
Recommended problems: 1, 3, 5, 8, 10, 11, 14, 16, 19, 20, 21, 22, 27, 28, 33, 34, 36, 42, 43, 44, 45, 46, 49, 52, 56, 58, 59, 61, 63

9. **Benzene and Aromaticity**

Sections covered: Chapter 15
Recommended problems: 1, 2, 3, 7, 9, 33, 35, 36, 46

10. **Electrophilic Aromatic Substitution**

Sections covered: Chapter 16
Recommended problems: 1, 4, 6, 7, 8, 9, 10, 11, 13, 14, 19, 21, 22, 24, 29, 31, 32, 33, 35, 36, 37, 41, 45, 46, 48, 55, 56, 58, 61, 65, 69, 73

11. **Amines and Heterocycles**

Sections covered: Chapter 24
Recommended problems: 1, 4, 5, 6, 8, 11, 14, 18, 24, 30, 34, 42, 43, 48, 49, 57, 61, 64

12. Pericyclic Reactions
Sections covered: Chapter 30
Recommended problems: 1, 2, 4, 5, 6, 7, 9, 14, 16, 18, 22, 24, 27, 28, 29, 30, 31, 39

EVALUATION CRITERIA
Students are required to complete all laboratory experiments. The lab experiments reinforce many of the chemical concepts covered in lecture and students are expected to apply the concepts to the laboratory experiments. Please remember that to receive a passing grade in CHE 261, you **must pass the laboratory portion** of the course. A passing grade for the laboratory portion of the course is 60%.

- Three mid-term exams, 40%
- Comprehensive final exam, 20%.
- Five problem sets, 15%
- Laboratory grade, 25%. All projects must be completed and a passing grade (≥60%) must be received in the laboratory component of the course in order to receive a passing grade in the course!!!

Final grades will be assigned by the following scale:

A+ (100-96)	B+ (85-82)	C+ (73-70)	D+ (61-58)	F <50
A (95-91)	B (81-78)	C (69-66)	D (57-54)	
A- (90-86)	B- (77-74)	C- (65-62)	D- (53-50)	

The instructor reserves the right to adjust the grading scales for class average at the end of the semester.

STANDARDS GUIDELINES

INTASC [Interstate New Teachers' Assessment & Support Consortium]

Scholarship

1. Knowledge of subject matter
2. Knowledge of human development & learning
3. Instruction adapted to meet diverse learners
4. Use of multiple instructional strategies & resources

Attitudes and Disposition

5. Effective learning environment created
6. Effective communication
7. Lesson planning

Integrity

9. Reflection and professional development

Professional Standards

National Science Teacher's Association

1. Content - Structure and interpret the concepts, ideas and relationships in science

2. Nature of Science - Define the values, beliefs and assumptions inherent to the creation of scientific knowledge within the scientific community

3. Inquiry - Formulating solvable problems, constructing knowledge from data, exchanging information for seeking solutions, developing relationships from empirical data

4. Context of Science - Relate science to daily life: technological, personal, social and cultural values.

5. Skills of Teaching - Science teaching actions, strategies and methodologies, interaction with students, effective organization and use of technology.

APPLICATION OF KNOWLEDGE THROUGH
2.1 instructional planning based upon knowledge of subject, students, curriculum & community
2.2 selection and/or creation of learning tasks that make subject meaningful for students
2.3 establishment and maintenance of appropriate behavior standards and creation of positive learning environment
2.4 creation of instructional opportunities supporting students' academic, social and personal development
2.5 use of verbal, nonverbal and media communication fostering individual and collaborative inquiry
2.6 employment of various instructional strategies in support of critical thinking, problem solving and skills demonstration
2.7 use of various assessment techniques to evaluate student learning & modify instruction

DEMONSTRATION OF PROFESSIONAL RESPONSIBILITY THROUGH:

Leadership 8. Assessment of student learning to improve teaching **Service** 10. Partnership with school and community	6. Curriculum - Extended framework of goals, plans, materials and resources for instruction. 7. Social Context - Social and community support network, relationship of science to needs and values of the community, involvement of people in the teaching of science. 8. Assessment - Alignment of goals, instruction and outcomes, evaluation of student learning. **9.** Environment for Learning - Physical spaces for learning, psychological and social environment, safety in science instruction. **10.** Professional Practice - Knowledge and participation in the professional community, ethical behavior, high quality of science instruction, working with new colleagues as they enter the profession.	3.1 professional conduct in accordance with the Code of Professional Responsibilities for Teachers 3.2 shared responsibility for student achievement and well-being 3.3 continuous self-evaluation regarding choices & actions on students and school community 3.4 commitment to professional growth 3.5 leadership in the school community 3.6 demonstrations of a commitment to students and a passion for improving the profession

TENTATIVE COURSE CALENDAR
See "Course Content Outline" above.

DISABILITY ACCOMMODATION STATEMENT

I believe in providing reasonable accommodations for students with documented disabilities on an individualized and flexible basis. If you are a student with a documented disability, the university's Disability Resource Center (DRC) determines appropriate accommodations through consultation with the student. Before you may receive accommodations in this class, you will need to make an appointment with the Disability Resource Center, located in EN C-105A. To speak with me about other concerns, such as medical emergencies or arrangements in case the building must be evacuated, please make an appointment as soon as possible.