COLLIN COLLEGE
COURSE SYLLABUS—LABORATORY

COURSE NUMBER: CHEM 2425

COURSE TITLE: Organic Chemistry II Laboratory

CREDIT HRS: 4 LECTURE HRS: 3 LAB HRS: 3 CLN/REC HRS. 1

PRE-REQUISITE: CHEM 2423

CO-REQUISITE: Concurrent enrollment in CHEM 2425 (lecture and recitation). You may repeat this course only once after receiving a grade, including W.

COURSE DESCRIPTION:
Laboratory activities reinforce advanced principles of organic chemistry, including the structure, properties, and reactivity of aliphatic and aromatic organic molecules; and properties and behavior of organic compounds and their derivatives. Emphasis is placed on organic synthesis and mechanisms. Includes study of covalent and ionic bonding, nomenclature, stereochemistry, structure and reactivity, reaction mechanisms, functional groups, and synthesis of simple molecules.

TEXTBOOK:

SUPPLIES:
Goggles, gloves, and aprons that meet the safety requirements of the Chemistry Department. Lab or normal eyeglasses are insufficient protective devices and will not be allowed. A Lab Notebook, as preferred by your instructor.

LEARNING OBJECTIVES:
Upon successful completion of the course students should be able to do the following:
1. Perform chemical experiments, analysis procedures, and waste disposal in a safe and responsible manner.
2. Utilize scientific tools such as glassware and analytical instruments to collect and analyze data.
3. Identify and utilize appropriate separation techniques such as distillation, extraction, and chromatography to purify organic compounds.
4. Record experimental work completely and accurately in laboratory notebooks, and communicate experimental results clearly in written reports.
5. Correlate molecular structure with physical and chemical properties of aliphatic and aromatic organic molecules.
6. Predict the mechanism and outcome of aliphatic and aromatic substitution and elimination reactions, given the conditions and starting materials.
7. Predict the chirality of reaction products based on enantiomeric and diastereomeric relationships.
8. Describe reaction mechanisms in terms of energetics, reaction kinetics, and thermodynamics.
9. Use spectroscopic techniques to characterize organic molecules and subgroups.
Additional Collin Outcomes

1. Using critical thinking, analyze an aromatic organic compound from any functional group or class and compose an acceptable IUPAC name or generate a structure from a given IUPAC name, and predict the chemical and physical properties of aromatic and multi-functional compounds. (Critical Thinking and Communication Skills)


3. Recognize and utilize the major reaction mechanisms: electrophilic aromatic substitution, nucleophilic aromatic substitution, benzyne, carbonyl addition, carbonyl addition-elimination, electrophilic addition, elimination, oxidation-reduction, free radical for the prediction of organic reaction products. (Critical Thinking and Communication Skills)

4. Utilize principles of kinetics, thermodynamics, and equilibria in the qualitative and quantitative prediction of reaction completion and product ratios. Reactions will also be evaluated relative to stereochemistry, regioselectivity and chemoselectivity. (Critical Thinking and Communication Skills)

5. Identify and predict the stability of reactive intermediates i.e. carbocations, carbanions and free radicals and discuss their structure, methods of stabilization and role in the context of a given reaction mechanism. (Critical Thinking, Communication Skills, and Empirical/Quantitative)

6. Use knowledge of acid base-theories to justify and predict proton transfer reactions and evaluate the possibility of carbanion generation from a given molecule. (Critical Thinking, Communication Skills, and Empirical/Quantitative)

7. Using critical thinking, analyze spectroscopic data; infrared, mass spectral, H-1 and C-13 Nuclear Magnetic resonance and ultraviolet-visible; for the elucidation of molecular structure. Relate specific spectral attributes to particular molecular features of a given molecule. (Critical Thinking, Communication Skills, and Empirical/Quantitative)

8. Safely work in teams in the laboratory to formulate and conduct experiments for reasonable multi-step syntheses of organic compounds from specified starting materials; qualitatively, quantitatively, and critically analyze lab data and communicate results using both written and electronic formats. (Critical Thinking, Communication Skills, Empirical/Quantitative, and Teamwork)

COURSE FORMAT:
May include but not limited to lectures, transparencies, videos, computer software, demonstrations, hands-on exercises, and student presentations.

METHOD OF EVALUATION:
Lecture average = 70% final grade
Lab average = 20% final grade
Recitation = 10% final grade
100% course grade for 4 college credits

Your laboratory instructor will advise, by written addendum, of the specific aspects of the grade policy that apply to your lab section. The policy of the Chemistry Department mandates that 20% of your final grade in the Chem 2425 block (lecture, lab, and recitation giving you 4 college credits in a lab science) will be based upon your final lab grade. Components of the lab grade may include, but are not restricted to lab reports, prelab assignments, lab quizzes, lab practicum or safety presentations.
**RECITATION:**
Recitation is a component of this course that enhances critical thinking and problem solving. This component will include, but is not limited to, some hands-on activities as well as group activities/discussions, and writing.

**ATTENDANCE POLICY:**
Students should attend all laboratory classes. There are **NO** make-up labs. Absences will be averaged as a zero. The lowest grade will be dropped. If **four or more labs are missed**, the **final lab average will be 0.00% at the end of the semester**. The instructor may bar students who miss the prelab lecture or who are not properly prepared to perform a lab from performing the lab in question. Students who elect to stop attending lab should officially drop this course. Please see the schedule of classes for the last day to withdraw. Religious Holy Days: Please refer to the current *Collin Student Handbook*

**ADA STATEMENT:**
Collin College will adhere to all applicable federal, state and local laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student’s responsibility to contact the ACCESS office, V/TTY 972.881.5898. ACCESS Offices are located in Rooms D118(I) at CPC, F118 at PRC, and D140 at SCC to arrange for appropriate accommodations. See the current *Collin Student Handbook* for additional information.

**ACADEMIC ETHICS:**
The college may initiate disciplinary proceedings against a student accused of scholastic dishonesty. Scholastic dishonesty includes, but is not limited to, statements, acts, or omissions related to applications for enrollment or the award of a degree, and/or the submission of material as one’s own work that is not one’s own. Scholastic dishonesty may involve one or more of the following acts: cheating, plagiarism, collusion, and/or falsifying academic records.

Cheating is willful giving or receiving of information in an unauthorized manner during an examination, illicitly obtaining examination questions in advance, using someone else’s work for assignments as if it were one’s own, copying computer or Internet files, and any other dishonest means of attempting to fulfill the requirements of a course.

Plagiarism is the use of an author’s words or ideas as if they were one’s own without giving credit to the source, including, but not limited to, failure to acknowledge a direct quotation.

Collusion is intentionally aiding or attempting to aid another in an act of scholastic dishonesty, including but not limited to, providing a paper or project to another student; providing an inappropriate level of assistance; communicating answers to a classmate during an examination; removing tests or answer sheets from a test site, and allowing a classmate to copy answers.