CHEM 2423.101H6
Organic Chemistry 1
Summer 2025
Tuesdays & Thursdays from 9:30 AM – 12:10 PM in STEAM 401
Online through D2L Brightspace

Instructor Information: Luke Turner | lturner16@com.edu | **409·933·8433**

Student hours and location:

Monday	09:00 – 10:00	Virtual (Microsoft Teams)
Tuesday	08:00 – 08:30	STEAM 325-23 & Virtual
Wednesday	08:00 – 08:30	STEAM 325-23 & Virtual
Thursday	08:00 – 08:30	STEAM 325-23 & Virtual
Friday | Saturday | Sunday	**Virtual Office Hours by Appointment**	

Required Textbook/Materials: Links to the free online textbooks and other open educational resources will be provided in the course materials folder located in D2L Brightspace. This course consists completely of **OER** (Open Educational Resources) and will NOT ***require*** a subscription to a homework service, a license to inclusive access, or any bookstore related ancillary materials. I will use a variety of free online resources, including my own Quizlet study sets and pdf worksheets, and these materials will be made available at ***ZERO*** cost to you.

Required Textbook: McMichael, K. Organic Chemistry – A "Carbonyl Early'' Approach [Online]; Creative Commons, 2024. [Creative Commons License CC BY-NC-SA 4.0]

Supplemental Textbooks: Reusch, W. Virtual Text of Organic Chemistry [Online]; Creative Commons, 2010. [Creative Commons License CC BY-NC-SA 4.0]; Solderberg, T. Organic Chemistry with a Biological Emphasis Volume I [Online]; Chemistry Publications, 2019. [https://digitalcommons.morris.umn.edu/chem_facpubs/1

Course Description: Access link to catalog course description: http://tinyurl.com/mr3ckcb6

Course Requirements: Apart from completing semester exams (~bi-weekly), other forms of assessment are completely optional, unless otherwise indicated. If you miss an exam, you will be required to take a make-up exam at the end of the semester. Two missed exams will require completion of a comprehensive final exam.

Assessment	Approximate Point Value	Overall Average	Grade
Semester Exams	~400 – 600 pts	≥89.5%	A
Class Activities*		79.5-89.4%	B
Quizzes*	~50 pts	69.5-79.4%	C
Homework*		59.5-69.4%	D
Laboratory Reports*	~100 pts	≤59.5%	F

*Optional components unless otherwise indicated.

Other grade assignments:

- **FN** —assigned at the discretion of the instructor in accordance with college policy.
- **I** — "***incomplete***" assigned at the discretion of the instructor in accordance with college policy.
- **W** — "***withdrawal***" assigned in accordance with college policy.

Late Work, Make-Up, and Extra-Credit Policy: Late work will not be accepted, and I am not going to provide make-up assignments. I provide enough "extra-credit" in the form of class activities and homework, so do not approach me at the end of the semester asking for extra credit.

Attendance Policy: Generally, the attendance policies prescribed in the current College Catalog (http://tinyurl.com/43vjb8sx) will be applied as far as Census Day reporting is concerned.

Communicating with your instructor: If you need to reach me, I am available by email (lturner16@com.edu) and phone (409.933.8433). ALL electronic communication with the instructor must be through your COM email. Due to FERPA restrictions, faculty cannot share any information about performance in the class through other electronic means.

Student Learner Outcome	Maps to Core Objective	Assessment(s)
1. Draw condensed structural formulas, bond-line formulas, perspective drawings, Newman projections, Fischer projections, Kekulé structures and Lewis structures of organic molecules	Critical Thinking	Selected Exam Questions
2. Apply the principles of Valence Shell Electron Pair Repulsion (VSEPR) Theory to ascertain the molecular geometry and bond angles of complex organic molecules	Critical Thinking Communication Skills	Selected Exam Questions Presentation
3. Apply the principles of the Valence Bond Model to ascertain the hybridization of atoms involved in bonding and to describe sigma and pi bonding	Critical Thinking	Selected Exam Questions
4. Apply the principles of Molecular Orbital (MO) Theory to construct MO diagrams, identify bonding MOs, anti-bonding MOs, the Highest Occupied Molecular Orbital (HOMO), the Lowest Unoccupied Molecular Orbital (LUMO), nodal planes and the relationship that exists between molecular stability and reactivity	Critical Thinking	Selected Exam Questions
5. Use curved arrows to interconvert between resonance contributors	Critical Thinking	Selected Exam Questions
6. Distinguish between equivalent, major and minor resonance contributors	Empirical and Quantitative Skills	Selected Exam Questions
7. Evaluate the relative contribution that various resonance structures provide to the resonance hybrid	Critical Thinking	Selected Exam Questions
8. Discuss the relationship between structure and acidity, basicity, nucleophilicity and electrophilicity	Critical Thinking	Selected Exam Questions
9. Interpret Maps of Electrostatic Potential (MEPs) to discern sites of nucleophilicity and/or electrophilicity	Critical Thinking	Selected Exam Questions
10. Assess whether substances are constitutional isomers, conformers, stereoisomers, enantiomers, diastereomers, resonance structures, identical or unrelated	Critical Thinking	Selected Exam Questions
11. Predict the relative stability of alkane and substituted alkane conformers, substituted cyclohexane conformers, cycloalkanes, alkenes, dienes, polyenes, carbocations and free radicals	Empirical and Quantitative Skills	Selected Exam Questions
12. Detect to which functional group(s) an organic compound belongs	Critical Thinking	Selected Exam Questions
13. Designate the intermolecular force(s) present in organic molecules	Empirical and Quantitative Skills	Selected Exam Questions
14. Discuss the relationship that exists between chemical and physical properties of families of carbon compounds and their composition	Team Work	Selected Experiment Grades
15. Predict relative physical properties such as boiling point, melting point, water solubility and molecular polarity of families of carbon compounds	Critical Thinking	Selected Experiment Grades
16. Draw specified types of constitutional isomers, conformers and stereoisomers within families of carbon compounds	Team Work	Selected Experiment Grades
17. Assess whether a specified family of carbon compound can behave as a Bronsted-Lowry acid, Bronsted-Lowry base, Lewis acid, Lewis base, nucleophile and/or electrophile	Empirical and Quantitative Skills	Selected Experiment Grades
18. Predict the relative acid strength, pK_a and base strength of families of carbon compounds	Empirical and Quantitative Skills	Selected Experiment Grades

Student Learner Outcome	Maps to Core Objective	Assessment(s)
19. Name alkanes, alkyl halides, alkenes, alkynes, alcohols, ethers and epoxides when a condensed structural formula, bond-line formula, Fischer projection or a Lewis structure is provided	Critical Thinking	Selected Exam Questions
20. Draw the structure of alkanes, alkyl halides, alkenes, alkynes, alcohols, ethers and epoxides when a substance's IUPAC name and, in some instances, when its common name is provided	Critical Thinking Communication Skills	Selected Exam Questions Presentation
21. Name stereoisomers written as perspective drawings, Newman projections or Fischer projections	Critical Thinking	Selected Exam Questions
22. Draw the structure of stereoisomers as perspective drawings, Newman projections or Fischer projections when its IUPAC name is provided	Critical Thinking	Selected Exam Questions
23. Outline the molecular attributes that generate chirality, stereoisomers, enantiomers, diastereomers, meso compounds, optical activity and racemic mixtures	Critical Thinking	Selected Exam Questions
24. Describe the relationship that exists between the optical rotation and specific rotation of chiral substances, achiral substances and racemic mixtures	Empirical and Quantitative Skills	Selected Exam Questions
25. Apply the Cahn-Ingold-Prelog Rules to assign stereochemical configuration to perspective drawings, Newman projections and Fischer projections	Critical Thinking	Selected Exam Questions
26. Ascertain the geometric configuration (*cis* or *trans* and/or *E* or *Z*) of disubstituted cycloalkanes and alkenes having at least two stereocenters	Critical Thinking	Selected Exam Questions
27. Predict the maximum number of stereoisomers in a compound	Critical Thinking	Selected Exam Questions
28. Predict the stereochemical outcome of stereospecific reactions involving alkyl halides, alkenes, alkynes, alcohols, ethers and epoxides	Critical Thinking	Selected Exam Questions
29. Predict the stability of compounds such as cycloalkanes, alkenes and free radicals by examining thermodynamic data	Empirical and Quantitative Skills	Selected Exam Questions
30. Predict the relative magnitude of the equilibrium constant (K) and standard free-energy (ΔG°) of acid-base reactions	Critical Thinking	Selected Exam Questions
31. Evaluate potential energy diagrams to determine the relative energy of reactants and products and to establish whether a reaction is endothermic, exothermic, endergonic or exergonic	Empirical and Quantitative Skills	Selected Exam Questions
32. Evaluate potential energy diagrams to determine the relative stability of conformers	Empirical and Quantitative Skills	Selected Exam Questions
33. Justify the observed product distribution in thermodynamically controlled addition reactions involving dienes and polyenes	Team Work	Selected Experiment Grades
34. Evaluate potential energy diagrams of substitution (S_N1 and S_N2) and elimination (E1 and E2) reactions to point out the number of mechanistic steps involved in a reaction and their energy of activation, which are fast steps and which is the rate determining step, and where along the reaction coordinate the location of transition states and reaction intermediates are found	Critical Thinking	Selected Experiment Grades
35. Predict the molecularity for the most predominant mechanistic pathway that substitution (S_N1 and S_N2) and elimination (E1 and E2) reactions are expected to take depending on existing reaction conditions (*e.g.*, substrate identity, nucleophile/base identity, leaving group identity, solvent identity and temperature)	Team Work	Selected Experiment Grades

Student Learner Outcome	Maps to Core Objective	Assessment(s)
36. Write the rate law for the most predominant mechanistic pathway that substitution (S_N1 and S_N2) and elimination (E1 and E2) reactions are expected to take depending on existing reaction conditions (*e.g.*, substrate identity, nucleophile/base identity, leaving group identity, solvent identity and temperature)	Critical Thinking	Selected Exam Questions
37. Predict the change in rate and product distribution of substitution (S_N1 and S_N2) and elimination (E1 and E2) reactions resulting from reaction condition manipulations, such as, changing the solvent concentration, nucleophile/base concentration, solvent polarity/dielectric constant or temperature	Critical Thinking Communication Skills	Selected Exam Questions Presentation
38. Construct potential energy diagrams of substitution reactions (S_N1 and S_N2), elimination reactions (E1 and E2) and 1,2– and 1,4– addition reactions to dienes	Critical Thinking	Selected Exam Questions
39. Predict the relative reaction rate of substitution (S_N1 and S_N2) and elimination (E1 and E2) reactions depending on existing reaction conditions (*e.g.*, substrate identity, nucleophile/base identity, leaving group identity, solvent identity and temperature)	Critical Thinking	Selected Exam Questions
40. Predict the relative reaction rate of free-radical halogenation reactions of alkanes depending on existing reaction conditions (*e.g.*, substrate identity and identity of halogen)	Critical Thinking	Selected Exam Questions
41. Justify the observed product distribution in kinetically controlled addition reactions involving dienes and polyenes	Empirical and Quantitative Skills	Selected Exam Questions
42. Predict the molecular outcome of combustion reactions	Critical Thinking	Selected Exam Questions
43. Predict the outcome of Brønsted-Lowry and Lewis acid-base reactions	Critical Thinking	Selected Exam Questions
44. Predict the molecular and stereochemical outcome of the catalytic reduction of alkenes and alkynes with hydrogen	Critical Thinking	Selected Exam Questions
45. Predict the molecular and stereochemical outcome of dissolving metal reduction reactions of alkynes	Critical Thinking	Selected Exam Questions
46. Predict the molecular and stereochemical outcome of substitution reactions of alkyl halides, alkyl sulfonates and alcohols.	Critical Thinking	Selected Exam Questions
47. Predict the molecular and regiochemical outcome of free-radical halogenation reactions of alkanes and free-radical allylic substitution reactions	Critical Thinking	Selected Exam Questions
48. Predict the molecular, stereochemical and regiochemical outcome of elimination reactions of alkyl halides, alkyl sulfonates and alcohols	Critical Thinking	Selected Exam Questions
49. Predict the molecular, stereochemical and regiochemical outcome of addition reactions of alkenes and alkynes	Critical Thinking	Selected Exam Questions
50. Predict the molecular, stereochemical and regiochemical outcome of ring opening reactions involving epoxides	Critical Thinking	Selected Exam Questions
51. Predict the molecular, stereochemical and regiochemical outcome of simple addition, conjugate addition and Diels-Alder reactions involving dienes	Critical Thinking	Selected Exam Questions
52. Illustrate the mechanism involved in acid-based reactions	Critical Thinking	Selected Exam Questions

Student Learner Outcome	Maps to Core Objective	Assessment(s)
53. Illustrate the mechanism involved in addition reactions of halogens to alkenes	Critical Thinking	Selected Exam Questions
54. Illustrate the mechanism involved in Markovnikov and anti-Markovnikov addition reactions	Critical Thinking	Selected Exam Questions
55. Illustrate the mechanism involved in free-radical substitution reactions of alkanes	Critical Thinking	Selected Exam Questions
56. Illustrate the mechanism involved in free radical allylic substitution reactions	Critical Thinking	Selected Exam Questions
57. Illustrate the mechanism involved in S_N2 reactions, S_N1 reactions, E1 reactions and E2 reactions of alkyl halides	Critical Thinking	Selected Exam Questions
58. Illustrate the mechanism involved in Diels-Alder reactions	Critical Thinking	Selected Exam Questions
59. Illustrate the mechanism involved in reactions involving carbocation rearrangement	Critical Thinking	Selected Exam Questions
60. Produce plausible reaction sequences to prepare and transform hydrocarbons such as alkanes, alkenes and alkynes from appropriate starting materials	Critical Thinking	Selected Exam Questions
61. Produce plausible reaction sequences to prepare and transform alkyl halides from appropriate starting materials	Critical Thinking	Selected Exam Questions
62. Produce plausible reaction sequences to prepare and transform alcohols from appropriate starting materials	Critical Thinking	Selected Exam Questions
63. Produce plausible reaction sequences to prepare and transform ethers from appropriate starting materials	Critical Thinking	Selected Exam Questions
64. Produce plausible reaction sequences to prepare and transform epoxides from appropriate starting materials	Critical Thinking	Selected Exam Questions

Academic Dishonesty: Any incident of academic dishonesty will be dealt with in accordance with college policy and the Student Handbook (http://tinyurl.com/v8yeztjp).

Student Concerns: If you have any questions or concerns about any aspect of this course, please contact me using the contact information previously provided. If, after discussing your concern with me, you continue to have questions, please contact Ms. Sheena Abernathy, Science Department Chair, at 409-933-8330/sabernathy@com.edu.

Tentative Course outline: The course schedule will be updated weekly in D2L and should be your primary resource for accessing learning materials and class scheduling. A ***tentative*** outline is tabulated below:

Weeks	Topics	Exam Date
1-2	Structure, Bonding, Reactivity and Stability of Organic Molecules	See D2L
2-3	Classifying, Naming, and Characteristic Properties of Organic Molecules	See D2L
3-4	Spatial Arrangement, Properties and Reactivity of Stereoisomers	See D2L
4-5	Thermodynamic & Kinetic Principles of Organic Chemistry	See D2L
5-6	Classifying and Illustrating Organic Reactions with Curved Arrows	See D2L
7-8	Nucleophilic Substitution & Elimination Reactions	See D2L
9-10	Acid-Base Reactions, Enolization & Carbon-Hydrogen Bond Activation	See D2L

Institutional Policies and Guidelines

Grade Appeal Process: Concerns about the accuracy of grades should first be discussed with the instructor. A request for a change of grade is a formal request and must be made within six months of the grade assignment. Directions for filing an appeal can be found in the student handbook **https://www.com.edu/student-services/docs/Student_Handbook_2024-2025_v2.pdf.** *An appeal will not be considered because of general dissatisfaction with a grade, penalty, or outcome of a course. Disagreement with the instructor's professional judgment of the quality of the student's work and performance is also not an admissible basis for a grade appeal.*

Academic Success & Support Services: College of the Mainland is committed to providing students the necessary support and tools for success in their college careers. Support is offered through our Tutoring Services, Library, Counseling, and through Student Services. Please discuss any concerns with your faculty or an advisor.

ADA Statement: Any student with a documented disability needing academic accommodations is requested to contact:
Kimberly Lachney, Student Accessibility Services Coordinator
Phone: 409-933-8919
Email: AccessibilityServices@com.edu
Location: COM Doyle Family Administration Building, Student Success Center

Textbook Purchasing Statement: A student attending College of the Mainland is not under any obligation to purchase a textbook from the college-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer.

Withdrawal Policy: Students may withdraw from this course for any reason prior to the last eligible day for a "W" grade. Before withdrawing students should speak with the instructor and consult an advisor. Students are permitted to withdraw only six times during their college career by state law. The last date to withdraw from the 1st 5-week session is June 30. The last date to withdraw from the 10-week session is July 29. The last date to withdraw for the 2nd 5-week session is August 1.

FN Grading: The FN grade is issued in cases of *failure due to a lack of attendance*, as determined by the instructor. The FN grade may be issued for cases in which the student ceases or fails to attend class, submit assignments, or participate in required capacities, and for which the student has failed to withdraw. The issuing of the FN grade is at the discretion of the instructor. The last date of attendance should be documented for submission of an FN grade.

Early Alert Program: The Student Success Center at College of the Mainland has implemented an Early Alert Program because student success and retention are very important to us. I have been asked to refer students to the program throughout the semester if they are having difficulty completing assignments or have poor attendance. If you are referred to the Early Alert Program you will be contacted by someone in the Student Success Center who will schedule a meeting with you to see what assistance they can offer in order for you to meet your academic goals.

Resources to Help with Stress:
If you are experiencing stress or anxiety about your daily living needs including food, housing or just feel you could benefit from free resources to help you through a difficult time, please click here https://www.com.edu/community-resource-center/. College of the Mainland has partnered with free community resources to help you stay on track with your schoolwork, by addressing life issues that get in the way of doing your best in school. All services are private and confidential. You may also contact the Dean of Students office at deanofstudents@com.edu or communityresources@com.edu.

Nondiscrimination Statement:
The College District prohibits discrimination, including harassment, against any individual on the basis of race, color, religion, national origin, age, veteran status, disability, sex, sexual orientation, gender (including gender identity and gender expression), or any other basis prohibited by law. Retaliation against anyone involved in the complaint process is a violation of College District policy.