

## Course Syllabus

Course Number: Chem 2425-002  
Course Title: Organic Chemistry II  
Course Director: Dr. Carissa Manrique  
Office Hours: Online Email

Trimester Credit Hours: 4  
Total Contact Hours Per Trimester: 90

### COURSE DESCRIPTION:

Our mission is to provide students with core knowledge in basic sciences so they can become successful as Parker students, on board exams, in treating patients, and eventually becoming chiropractors and leaders in the field of wellness.

The topics covered that will be covered in Organic II are in depth studies of the main functional groups found in organic chemistry and your body. A list of topics includes: reaction synthesis and mechanisms for alcohols, epoxides, ethers, ketones, aldehydes, amides, carboxylic acids and acid derivatives. In addition, students will be proficient in spectroscopy techniques such as NMR, IR and MS

This is an online course that is accelerated but also self-paced. I am always available through email to help you each step of the way.

### GENERAL APPROACH TO TEACHING:

As I learn more about the teaching process and tools and techniques for engaging students and improving classroom techniques, I hope to become a stronger teacher, and leave students with a better understanding of science. I employ several active learning techniques, in an attempt to keep students involved. To get students involved in the process of learning, I have found that giving varied assignments and multiple examples are effective techniques.

I teach because I have a passion to work with students and help them develop fundamental skills to have a successful life. I teach organic chemistry which is traditionally thought of as a “dreaded” course by students by challenging student’s preconceived thoughts and show them that organic chemistry applies to every aspect of their lives and is nothing to be feared. I educate with a more relaxed style where students are welcome to chime in at any point in the lecture and ask questions. I measure the effectiveness of my class in several ways: First, the traditional exams, quizzes. Second, I have students build wiki pages over organic chemistry studies they find interesting online. The more involved and detailed these pages become the more I realize they are learning. Last, I can tell by informal means such as student’s facial expressions and the quality of questions they are asking in class. There is nothing better than seeing a student who has an expression of full understanding of a challenging concept.

## COURSE REQUIREMENTS

To succeed in this course I recommend studying approximately 1 hour each day over the new material learned in class. This class is accelerated and each day you will learn many new topics. It is vital that you keep up with the material and review every day. I recommend using note cards for each organic concept and reaction in each chapter. When doing the online homework make sure you can understand all problems and can work them out by yourself. I do not mind if you work in groups to do the homework but remember you will only benefit if you can work them out independently. The lab reports are completed individually; you can get help from a peer but make sure you understand the material. All lab citations will be in APA format. All assignments MUST be turned in on time. No late assignments will be accepted.

## ESTIMATE OF STUDENT WORKLOAD:

The estimated workload for this class is approximately 2 hr studying/1hr lecture

## LEARNING OUTCOMES:

At the completion of this course, the student should:

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1. Apply the foundation of various chemistry bonding models to structure and bonding of organic molecules
2. Dissect and synthesis properties and structures of the main organic chemistry functional groups
3. Analyze and Interpret various IR, NMR and MS spectra
4. Evaluate and explain laboratory data.
5. Create an organic chemistry webpage based on application of organic chemistry classroom material

## Weekly Learning Outcomes:

### **Week 1. Objectives Chapters 12 & 13 Wade**

- i) Recognize IR peaks
- ii) Understand IR theory
- iii) Read and interpret IR spectra
- iv) Understand MS theory
- v) Recognize MS base peaks
- vi) Understand NMR theory
- vii) Recognize NMR chemical shifts
- viii) Interpret NMR signals and splitting

### **Week 2. Objectives Chapters 10 & 11 Wade**

- i) Interpret NMR spectra
- ii) Classification of alcohols

- iii) Nomenclature
- iv) Properties and acidity
- v) Alcohol synthesis
- vi) Water In acidic solutions
- vii) Oxymercuration demercuration
- viii) Hydroboration
- ix) Diols
- x) Grinard
- xi) Reduction of carbonyls
- xii) Thiols

**Week 3. Objectives Chapters 11 & 14 Wade**

- i) Oxidation of alcohols
- ii) Tosylate elimination/substitution
- iii) Reactions with HBr or HCl
- iv) Reactions with  $\text{SOCl}_2$ ;  $\text{PBr}_3$
- v) Esterification
- vi) Williamson Ether
- vii) Alkoxymercuration
- viii) Ether Cleavage
- ix) Thiols
- x) Addition to Epoxides (acid and base)

**Week 4. Objectives Chapters 16 & 17 Wade**

- i) Polygon Rule
- ii) Aromatic
- iii) Antiaromatic
- iv) Nonaromatic
- v) Basic Nitrogens
- vi) Bromination of Benzene
- vii) Nitration of Benzene
- viii) Reduction of Nitro
- ix) Sulfonation of Benzene
- x) Friedel-Crafts Alkylation
- xi) Friedel-Crafts Acylation

**Week 5. Objectives Chapters 17 Wade**

- i) Ortho/Para directors
- ii) Meta Directors
- iii) Multiple substituents
- iv) Nucleophilic Aromatic Substitutions
- v) Side Chain Oxidation
- vi) Bromination with light
- vii) Ketone and Aldehyde IUPAC

- viii) Oxidation of alcohols
- ix) Ozonolysis of alkenes
- x) Friedel Crafts
- xi) Hydration of alkenes
- xii) Hydroboration of alkenes

**Week 6. Objectives Chapters 18 & 19 Wade**

- i) Ketones from Carboxylic Acids
- ii) Ketones from Nitriles
- iii) Lithium with Acid Chlorides
- iv) Aldehyde from Acid Chlorides
- v) Hydration of ketone/aldehyde
- vi) Protecting Group
- vii) Wittig
- viii) Imine formations
- ix) Reductions
- x) Amine nomenclature
- xi) Hoffman
- xii) Cope
- xiii) Reductive Animation
- xiv) Aniline protecting group

**Week 7. Objectives Chapters 20 & 21 Wade**

- i) Carboxylic acid nomenclature
- ii) Oxidation of alcohols
- iii) Cleavage of Alkenes and Alkynes
- iv) Benzene side chain oxidation
- v) Carbon Dioxide and Grignard
- vi) Hydrolysis of Nitriles
- vii) Esterification
- viii) Amides
- ix) Reduction
- x) Acid Chlorides
- xi) Reactions of Acid Chlorides
- xii) Reactions of Anhydrides
- xiii) Reactions of Esters
- xiv) Reactions of Amides

**ASSESSMENT:**

The student will be assessed through discussion questions, lecture exams, online homework

**PREREQUISITES:**

Enrollment in Parker University, High School chemistry, College algebra, General

chemistry I and II

REQUIRED TEXTBOOKS:

“Organic Chemistry” 7th ed L.G. Wade

RECOMMENDED ADDITIONAL TEXTBOOKS:

Organic Chemistry I as a Second Language: Translating the Basic Concepts by David Klein

SUPPLIES:

Access to a computer that is compatible with the My Parker website and can support the course resources, basic calculator with log functions, scantrons, pencils, Sapling online learning hw system, lab goggles, lab coat, latex gloves

GRADING SYSTEM:

Evaluation is an integral part of the educational process and is used as an educational tool to help students identify problem areas, to recognize and reward achievement, and to identify students who are unable to meet the rigors of the curriculum. Our class will be graded on a point system, so each assignment or exam is worth a designated amount of points that will be totaled for a final average. This will allow students not to focus on averages but instead have positive mindsets about the points they earned. Final course grades and their interpretation are listed below:

Grade	Numerical Value	Grade Point Average	Interpretation of Academic Achievement
A	89.5-100	4.0 (>1071 pts)	Excellent
B	79.5-89.49	3.0 (>952 pts)	Above Average
C	69.5-79.49	2.0 (>833) pts	Satisfactory
D	69.49 or Below	0.0 (< 833) pts	Unacceptable

This grading scale is strictly adhered to. There are NO exceptions.

Exams: (4)                      33%                      (100pts each)

Final Exam (1)                12%                      (150 points)

Lab Reports: (5)                10%                      (20 pts each)

Lab Worksheets (10)        12%                      (15 pts each)

Lab Exams (2)                 8%                        (50 pts each)

Discussions: (6)               4%                        (110 pts)

Online HW (9)                15%                      (20 pts each)

**Total:                            100%                      (1190 points)**

LABS:

Lab coat, Goggles, Latex Gloves

My Parker Website: Description of Assessments

1. **Discussion postings-** the student will be expected to create one original discussion posting answering the question posed by the instructor. This must be posted no later than midnight on Monday in that week. The student is expected to make at least 2 substantive responses to discussion postings by other students by Monday at midnight. The discussions can be found on “week X” and clicking on “Forum Home”. Examples below will help determine acceptable posts and replies. Each week 1 or more parts of this rubric will be applied to the grading of your discussion post.

Discussion Critical Thinking Rubric

Trait	Does Not Meet Expectations (1)	Meets Expectations (2)	Exceeds Expectations (3)	N/A
<b>Purpose</b>	☒ Does not clearly understand the purpose of the assignment	☒ Demonstrates an understanding of the assignment’s purpose	☒ Demonstrates a clear understanding of the assignment’s purpose	
<b>Key Question, Problem, or Issue</b>	☒ Defines the issue, but poorly (superficially, narrowly); may overlook some core issues or fails to clearly define the issue or problem ☒ Has trouble maintaining a fair-minded approach toward the problem	☒ Defines the issue; identifies the core issues, but may not fully explore their depth and breadth ☒ Demonstrates fair-mindedness	☒ Clearly defines the issue or problem; accurately identifies the core issues ☒ Appreciates depth and breadth of problem ☒ Demonstrates fair-mindedness toward problem	
<b>Point of View</b>	☒ May identify other points of view but struggles with maintaining fair-mindedness; may focus on irrelevant or insignificant points of view	☒ Identifies and evaluates relevant points of view ☒ Is fair in examining those views	☒ Identifies and evaluates relevant significant points of view ☒ Is empathetic, fair in examining all relevant points of view	
<b>Information</b>	☒ Gathers some credible information, but not enough; some information may be irrelevant or unreliable ☒ Omits significant information, including some strong counter-arguments ☒ Sometimes confuses information and the inferences drawn from it	☒ Gathers sufficient, credible, and relevant information ☒ Includes some information from opposing views ☒ Distinguishes between information and inferences drawn from it	☒ Gathers sufficient, credible, relevant information: observations, statements, logic, data, facts, questions, graphs, themes, assertions, descriptions, etc. ☒ Includes information that opposes as well as supports the argued position ☒ Distinguishes between information and inferences drawn from that information	
<b>Concepts</b>	☒ Identifies some (not all) key concepts, but use of concepts is	☒ Identifies and accurately explains and uses the key	☒ Identifies and accurately explains/uses	

	superficial and inaccurate at times or ignores relevant key concepts altogether	concepts, but not with the depth and precision of a "3"	the relevant key concepts	
<b>Assumptions</b>	☒Fails to identify assumptions, or fails to explain them, or the assumptions identified are irrelevant, not clearly stated, and/or invalid	☒Identifies assumptions ☒Makes valid assumptions	☒Accurately identifies assumptions (things taken for granted) ☒Makes assumptions that are consistent, reasonable, valid	
<b>Interpretations and Inferences</b>	☒Does follow some evidence to conclusions, but inferences are more often than not unclear, illogical, inconsistent, and/or superficial ☒May also exhibit closed-mindedness or hostility to reason; regardless of evidence, maintains or defends views based on self-interest	☒Follows where evidence and reason lead to obtain justifiable, logical conclusions ☒Makes valid inferences, but not with the same depth and as a "3"	☒Follows where evidence and reason lead in order to obtain defensible, thoughtful, logical conclusions or solutions ☒Makes deep rather than superficial inferences ☒Makes inferences that are consistent with one another	
<b>Implications and Consequences</b>	☒Has trouble identifying significant implications and consequences; identifies improbable implications	☒Identifies significant implications and consequences and distinguishes probable from improbable implications, but not with the same insight and precision as a "3"	☒Identifies the most significant implications and consequences of the reasoning (whether positive and/or negative) ☒Distinguishes probable from improbable implications	

Example of Average Post:

What is an aldehyde? How can I apply this to my chiropractic career?

Post: An aldehyde is an organic chemistry functional group; I need this class to get my degree

Posts: Type of carbonyl; Ill Probably need to know this for Biochemistry

Reply: I agree

Reply: An aldehyde is an organic chemistry functional group, good job

Critical Thinking Posts and Replies:

Posts: An aldehyde is an organic chemistry functional, specifically a carbonyl. A carbonyl is a carbon that is connected to oxygen through a double bond. An aldehyde is a

carbonyl that has at least one hydrogen bonded to the carbonyl carbon. A functional group is the reactive portions of a hydrocarbon where the reaction will take place. The reactivity of the aldehyde is due to the electronegative oxygen that pulls the electron density towards itself giving the carbonyl carbon a partial positive charge.

I can apply this to my chiropractic career because aldehydes are found throughout the body. Aldehydes are oxidized in the body to carboxylic acids and secreted through the urine. Ethanol in the body is also oxidized, first to the aldehyde then to the carboxylic acid. A person on a detox diet promotes aldehyde oxidation so the body can be purified of any unwanted aldehyde compounds. Aldehydes are also converted to imines and hemiacetals through nucleophilic reactions to be further reacted in the body.

Reply: This is interesting! Do you see the same effect happen with ketones since they have similar connectivity? How are imines and hemiacetals found in the body? Is this how they detox patients of alcohol when they are consuming a lot? I had a friend.....

1. **Lecture Exams:** Will be given online using the Sapling learning website. You will have two hours to complete the exam and two attempts per problem. The exam will prompt you when you get an answer wrong and give you a hint and allow you one more attempt to the problem.
2. A comprehensive exam. 50% comprehensive and 50% new material. This exam will also be given online using the Sapling learning website
3. **Weekly Assignments page-** Each week you will find a page on the My Parker website. Each weekly page contains material for the weeks lecture. Lecture notes, handouts, lab materials, discussions link and an outline of lecture topics are found.
4. **Daily lecture vodcasts:** This is how your lecture material will be provided to you, you will be required to watch approximately 4/ wk. These aren't just a lecture capture but a valuable study tool. Students will be able to review the vodcast for the day at your own speed and review them anytime. The program allows you to pause, stop, play, rewind, etc. Historically, students that re-reviewed the vodcasts were highly successful in the classroom
5. **Lab Materials-** This section on MyParker contains a safety video that will be viewed before your first lab session. In addition, the lab rubric and lab rules are also found on MyParker. The MyParker lab section will have all materials, lab reports, what is expected, etc for each week.



6. **Lab Reports:** You will submit all assignments through a Forum located on the class lab Parker page, a handout and video instructions can be found under “lab materials” on MyParker. Each week one labreport, two worksheet and two videos submissions are due. The grading rubric for the lab reports can be found on MyParker under “Lab Materials”

7. **Online HW system: Sapling Learning - Online Organic Chemistry Practice Problems**

The majority of organic problems involve structure drawing, and, depending on the question, stereochemistry or curved arrows must also be drawn. Some questions allow one to drag given structures/formulas to rank by a property (e.g., acidity) or sort into groups (e.g., alkene vs. alkyne). Nomenclature questions allow one to type in the name. There are also some multiple choice questions. Altogether, the online problems: 1) allow pretty much any question that is asked on paper to be performed on a computer; 2) enable one to draw their own structures, just as they will need to do on an exam; 3) grade instantly and provide feedback via tutor-like hints, allowing one to keep working with a question to arrive at the correct answer; 4) include detailed answer explanations.

1. Go to <http://saplinglearning.com>
2. a. If you already have a Sapling Learning account, log in, click "View Available Courses", then skip to step 3. b. If you have a Facebook account, you can use it to quickly create a SaplingLearning account. Click "create account" located under the username box, then click "Login with Facebook". The form will auto-fill with information from your Facebook account (you may need to log into Facebook in the popup window first). Choose a password and timezone, accept the site policy agreement, and click "Create my new account". You can then skip to step 3. c. Otherwise, click "create account" located under the username box. Supply the requested information and click "Create my new account". Check your email (and spam filter) for a message from Sapling Learning and click on the link provided in that email.
3. Find your course in the list (listed by school, course, and instructor) and click the link.
4. Select your payment options and follow the remaining instructions.
  - Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments.
  - During sign up - and throughout the term - if you have any technical problems or grading issues, send an email to [support@saplinglearning.com](mailto:support@saplinglearning.com) explaining the issue. The Sapling support team is almost always more able (and faster) to resolve issues than your instructor and TAs.

COMMUNICATION WITH THE INSTRUCTOR:

The instructor will respond to E-mails posted through the course page within 24 hours during the week and within 48 hours on the weekend. In addition, notifications will also be posted on the My Parker website. If student needs additional help it is encouraged to come to my posted office hours.

**A complete listing of all Academic policies is found on the [https://my.parker.edu/ICS/Academics\\_-\\_Coursework/Academics/Common\\_Policies/](https://my.parker.edu/ICS/Academics_-_Coursework/Academics/Common_Policies/):**

Absences for Religious Holidays

Academic Dishonesty

Academic Promotion, Probation and Dismissal Policy

Altering Grades on Exams

Appeals

Assistance and Accommodations

Attendance Policy

Audio/Video Taping

Cell Phones and Electronic Devices in Class

Classroom Behavior

Communications

Computer Usage

Exam Review

Examinations (Make up Exams/Lab Practicals)

Excused Absences

Final Examinations

Grading System

Late Instructors to Lecture/Lab

Grade Appeals Process

Missed Exam Policy

Professional Decorum

Special Needs Consideration

## Student Bereavement Policy

### **DISCLAIMER**

The lecture outlines contained in the lecture booklet are NOT intended to represent the entire content of the course. A lecture outline is intended to be a guide to the lecture. The responsibility of the instructor is to follow the outline, expand the concepts and give explanation and illustrations to clarify content. The role of the student is to attend lecture and take notes over material presented by the lecturer that explains and illustrates the material listed in the outline. It is also the responsibility of the student to question the instructor if explanations and illustrations are not clearly presented or understood.

The instructors take no responsibility for the accuracy or completeness of old notes, quiz questions or exam questions that students may purchase, acquire from off of the internet or be given by previous students.

### **IMPORTANT NOTE:**

The provisions contained in this syllabus do not constitute a binding contract between the student and the Parker University, College of Chiropractic. These provisions may be changed at any time and for any reason at the discretion of the Course Director. When it is necessary to make changes to this document, appropriate notice (at least one week, if at all possible) will be given to the student(s).