



## Course Syllabus

### CHEM 2423 – Organic Chemistry I

**Catalog Description:** Fundamental principles of organic chemistry will be studied, including the structure, bonding, properties, and reactivity of 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. THIS COURSE IS INTENDED FOR STUDENTS IN SCIENCE OR PRE-PROFESSIONAL PROGRAMS.

**Lecture hours = 3    Lab hours = 3**

**Prerequisites:** CHEM 1312 and CHEM 1112, or CHEM 1412 General Chemistry II (Lecture and Laboratory)

**Semester Credit Hours: 4 Lecture**

**Hours per Week: 3 Lab Hours per**

**Week: 3**

**Contact Hours per Semester: 96**

**State Approval Code: 40.0504.52 03**

#### **Class section meeting time:**

#### **Core Components and Related College Student Learning Outcomes**

This course counts as part of the academic requirements of the Panola College Core Curriculum and an Associate of Arts or Associate of Science degree.  Yes    No: If no, skip to Instructional Goals.

The items below marked with an X reflect the state-mandated outcomes for this course **IF this is a CORE course:**

- Critical Thinking Skills – to include creative thinking, innovation, inquiry and analysis, evaluation and syntheses of information
  - CT1: Generate and communicate ideas by combining, changing, or reapplying existing information
  - CT2: Gather and assess information relevant to a question
  - CT3: Analyze, evaluate, and synthesize information
- Communication Skills – to include effective development, interpretation, and expression of ideas through written, oral, and visual communication
  - CS1: Develop, interpret, and express ideas through written communication
  - CS2: Develop, interpret, and express ideas through oral communication
  - CS3: Develop, interpret, and express ideas through visual communication

- Empirical and Quantitative Skills – to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions
  - EQS1: Manipulate and analyze numerical data and arrive at an informed conclusion
  - EQS2: Manipulate and analyze observable facts and arrive at an informed conclusion
- Teamwork – to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal
  - TW1: Integrate different viewpoints as a member of a team
  - TW2: Work with others to support and accomplish a shared goal
- Personal Responsibility – to include the ability to connect choices, actions, and consequences to ethical decision-making
  - PR1: Evaluate choices and actions and relate consequences to decision-making
- Social Responsibility – to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities
  - SR1: Demonstrate intercultural competence
  - SR2: Identify civic responsibility
  - SR3: Engage in regional, national, and global communities

### **Instructional Goals and Purposes:**

Organic Chemistry is a two semester sophomore level course in the study of organic compounds and reactions. The first semester, Chemistry 2423, provides a review of relevant topics from General Chemistry and then proceeds through the nomenclature and reactions of the hydrocarbons and halo-hydrocarbons. Stereochemistry and instrumental methods of structure determination are also included. At the end of the semester, benzene and its derivatives are studied in a natural progression subsequent to studying conjugated dienes, completing the last homologous series. Logical problem solving is an integral part of the course at all levels. Both semesters have a required laboratory component for credit. The laboratory meets once a week for four hours, with options for additional time, as needed. Laboratory exercises include experiments primarily to illustrate technique, experiments to perform synthesis and analysis, and exercises to provide experience in model development for both structure and theory. The lab is well equipped, with instruments for spectroscopy and chromatography experiments. A formal laboratory notebook is kept by each student. There is heavy emphasis on safety, proper handling and waste disposal of chemicals.

### **General Course Objectives:**

1. Understand and be able to explain the general principles, laws, and theories of chemistry that are discussed and presented throughout the semester
2. Use critical thinking and logic in the solution of problems
3. Apply learned chemistry skills to new situations
4. Demonstrate an understanding of chemistry through technological advancement
5. Apply chemical principles in the laboratory setting
6. Develop independent and cooperative learning skills
7. Recognize and acquire attitudes that are characteristic of the successful worker regardless of the major field of study
8. Develop an awareness of the value of chemistry in our daily living

**Learning Outcomes: [from the ACGM catalog]**

After studying all materials and resources presented in the course, the student will be able to:

1. Classify organic compounds by structure, molecular orbitals, hybridization, resonance, tautomerism, polarity, chirality, conformation, and functionality.
2. Identify organic molecules using appropriate organic nomenclature.
3. Describe the principle reactions for syntheses of molecules, ions, and radicals.
4. Describe organic reactions in terms of radical and ionic mechanisms.
5. Describe the use of spectroscopic data to determine the structure of organic molecules.
6. Formulate appropriate reaction conditions for the synthesis of simple organic molecules.
7. Perform chemical experiments, analysis procedures, and waste disposal in a safe and responsible manner.
8. Utilize scientific tools such as glassware and analytical instruments to collect and analyze data.
9. Identify and utilize appropriate separation techniques such as distillation, extraction, and chromatography to purify organic compounds.
10. Record experimental work completely and accurately in laboratory notebooks, and communicate experimental results clearly in written reports.
11. Demonstrate a basic understanding of stereochemistry.
12. Classify organic compounds by structure, molecular orbitals, hybridization, resonance, tautomerism, polarity, chirality, conformation, and functionality in laboratory reports.
13. Identify organic molecules using appropriate organic nomenclature in laboratory reports.
14. Perform organic syntheses of molecules.
15. Describe organic reactions in terms of radical and ionic mechanisms in laboratory reports.
16. Use spectroscopic data to determine the structure of organic molecules.
17. Formulate appropriate reaction conditions for the synthesis of simple organic molecules.

**Course Content:**

Students in all sections of this course will learn the following content:

1. Describe the development of the structure of compounds using atomic orbitals, bonding theories, molecular orbitals, and hybridization.
2. Use orbital descriptions to predict molecular geometries.
3. State and apply LeChatelier's Principle, the Arrhenius equation, the Lewis theory of acids and bases, and the Henderson-Hasselbach equation.
4. Name and identify isomers of alkanes, alkenes, alkynes, and cyclic compounds.

5. Describe conformations of chain, cyclic, and polycyclic molecules.
6. Describe detailed mechanisms for common reactions: addition, elimination, substitution, free radical, and condensation.
7. Describe industrial and laboratory preparation of important chemicals.
8. Define optical activity and discuss the significance of chirality; draw and identify Fischer projections.
9. Describe reactions of the alkyl halides and use as a model to discuss  $S_N1$ ,  $S_N2$ , E1, E2.
10. Describe the critical features of molecular structure specific to various instrumental analyses: mass spectrometry, IR, UV, GC, NMR.
11. Discuss the structure and reactivity significance of conjugated double bonds.
12. Discuss the chemistry of color and vision.
13. Describe the electronic and molecular structure of benzene and relate to typical reactions.
14. Name, identify, and state common uses for derivatives of benzene.
15. State and describe specific laboratory, biological, and environmental chemical hazards of frequently used chemicals, such as benzene, methanol, ether, phenol, etc.

**Methods of Instruction/Course Format/Delivery:** Lecture, class discussion, lecture activities, canvas quizzes, reading and homework problem assignments, and laboratory experimentation

**Assessment:**

1. Homework- completion of assigned reading and problems from the textbook
2. Lecture Activities – participation in classroom discussions and practice problems, completion of quizzes
3. Laboratory Experiments – Laboratory experiments are to be completed each week during the laboratory period. Participation in the experiment is worth 40 points. A quiz about each experiment is given at the beginning of the lab period each week and is worth 10 points. Laboratory reports are due by the end of the lab period and are worth 50 points.
4. Unit Exams – Four unit exams are given throughout the semester that are worth 100 points each. No one coming in late may start an exam after the first person has left. One unit exam may be made up at the end of the semester at a time designated by the instructor.
5. Final Exam – completion of a comprehensive test at the end of the semester

**Classroom Policies**

**Attendance** – is expected at all labs. Attendance in lecture and lab is required for course completion. Class attendance is monitored and recorded. However, this level of instruction includes expected personal responsibility that will not always be addressed. YOU are responsible for missed information. Attendance WILL affect your grade because you probably missed something you needed to learn how to do. If you miss a class, it is your responsibility to contact the instructor about what you missed. Please see syllabus and make up work policies before you ask. See the handbook for rules concerning allowed absences.

**NO CELL PHONES**- Cell phones are not allowed to be used as calculators in class or lab.

**Withdrawal Policy:** A student may need to withdraw from the course before the semester's end. It is the student's responsibility to complete and submit the appropriate forms (as provided by the student success office) on or before the withdrawal date. The withdrawal date is posted on the college academic calendar. A student

who ceases to attend class without formal withdrawal will receive a grade of "F" for the course. The instructor reserves the right to withdraw a student from the course in accordance with college policy. Students should consider that they may only drop 6 total courses during their college tenure.

**Incomplete Grade:** An Incomplete grade is a temporary grade given to a student who is unable to complete the course as the result of an authorized absence (i.e. serious illness or emergency).

Incomplete grades will only be approved by the instructor for students who have maintained good standing in the course. All incompletes must be further approved by the Vice President of Instruction. Students should note that an incomplete grade ("I") has the effect of an "F" on their GPA. The "I" will be removed once the student completes the course. Students have a maximum of six weeks to complete the course from the semester's end or they will receive a grade of "F" for the course.

**Classroom Etiquette:** Students should arrive on time and remain in class until the full class period has expired. Appropriate dress attire should be worn (i.e. no pajamas or overly revealing attire), headwear should be removed, and students should be respectful (in language and behavior) toward one another and the instructor. **Students are highly encouraged to engage the class by participating in class discussions and asking appropriate questions. The standards of student conduct must be maintained with the instructor outside of class and in all electronic communication with the instructor or other students.**

Cell phones, computers, and all other electronic devices must be turned off before the beginning of class unless indicated by the instructor. Students shall be allowed to record lectures but their recording device must be placed at the front of the class on or near the instructor. Recording a lecture does not excuse a student from attending class.

At all times students are expected to uphold the standards of student conduct as defined in the Student Handbook. A failure to comply with these conditions will result in removal from the classroom and an absent mark on the attendance record.

**Internet Etiquette:** All online users should take great care in their internet behavior. Students are expected to remain respectful in all electronic communication as any publicly or privately shared media will be viewed by others. This communication includes all written material, submitted assignments, pictures, audio recordings, and video recordings. The instructor reserves the right to remove online submissions that contain inappropriate or obscene material. Students who violate proper internet etiquette in an assignment shall fail the assignment on the first offense and shall fail the class upon the second offense.

No user shall post personal or confidential information concerning another party without their express permission. No student shall copy, alter or share files of course material submitted by another student. All of the standards of the academic honesty policy shall apply to all online course material. Students shall be held accountable for posting libelous or obscene material on any electronic forum hosted or expressly regulated by the college under user agreement. The instructor and the college reserve the right to remove said material and hold disciplinary actions in accord with college policy. At all times students are expected to uphold the standards of student conduct as defined in the Student Handbook. The instructor and the college shall have the right to remove a student from the course (resulting in a failing grade) and take appropriate disciplinary actions (as defined by the student handbook) for violating any of the aforementioned policies.

**Cheating:** "Cheating" is defined as unauthorized help on an examination or assigned course material.

A student must not receive from any other student or give to any other student any information, answers, or help during an exam. A student must not "steal" the answers from an unsuspecting student during an exam.

A student must not use any sources for answers during an exam (including, but not limited to: notes, books, or electronic devices) without prior authorization from the professor.

A student must not obtain exam questions illegally, tamper with the exam questions, nor change the results of an exam after it has been graded.

All cheating infractions will result in a grade of "0" for the assignment. A student will fail the class upon their second cheating offense. This policy shall be adhered to unless mitigating circumstances should prove a lesser penalty should apply.

Students shall have the right to contest a cheating claim. The appeals process is specifically defined in the student handbook.

**Plagiarism:** "Plagiarism" is defined as the taking of a person's ideas, words, or information and claiming those properties as one's own. The use of all ideas, words, or information from any source must be properly referenced and due credit must be given to its author.

All class assignments must be submitted through Canvas. Canvas will run the submitted assignments through [turnitin.com](https://turnitin.com). Any assignment which scores higher than 40% on copied material will automatically receive a grade of "0". Properly quoting and citing borrowed information is NOT plagiarism. However, since the integrity of the assignment is based upon the originality of the student's work, no student may turn in a paper which

exceeds a 30% score in properly quoted and cited material.

The instructor reserves the right to employ other means outside of [turnitin.com](https://www.turnitin.com) to check the "originality" of a student's work. Students shall have the right to contest a plagiarism or cheating claim. The appeals process is specifically defined in the student handbook.

All plagiarizing infractions will result in a grade of "0" for the assignment. A student will fail the class upon their second plagiarizing offense. This policy shall be adhered to unless mitigating circumstances should prove a lesser penalty should apply.

**Privacy Policy:** The instructor will uphold the privacy of a student's grades, disability, and all other personal information in accord with school policy, state and federal law.

A student perpetually maintains the right to review their course grades. A student's right to review their grades shall not be interpreted as the right for the release of an instructor's grading keys.

The instructor and the college do not assume responsibility for the disbursement of any grade information a student freely gives of himself in private correspondence or in a public forum. The instructor reserves the right to remove grade information which a student freely reveals of him or herself in an online public forum hosted or regulated by the college to preserve the integrity of the course.

The instructor reserves the right to pursue disciplinary and legal action against any student who illicitly obtains and reveals private instructional information, including, but not limited to answer keys or class grades.

**Disability Policy:** Students with a learning disability must verify their disability with the Career/Technical Advisor in the Student Success Office. The student is responsible for presenting proper verification to the instructor at the beginning of the course. Upon verification, the instructor shall make the appropriate accommodations for the student. The instructor shall not implement special accommodations for students whose disability has not been verified by the college. The instructor is not responsible for a student's poor class performance before verification is presented.

Students with a condition that may require emergency assistance (i.e. seizures, pacemaker malfunctions, hyperventilation, etc) should meet with the instructor in private to discuss emergency procedures.

A disability does not exempt a student from proper classroom etiquette or the student code of conduct. This class will fully comply with the college handbook, state, and federal laws.

### **Instructor Philosophy:**

Chemistry is a core discipline essential to a college education regardless of major or career choice. Recognizing a broad range of interests, preparations, and future needs among chemistry students, this course is designed to allow each student to individually select topics for various assignments in order to further develop possible career choices. Every attempt by the instructor is made to ensure your area of interest is discussed. Please let the instructor know if there is a topic that particularly interests you.

Organization is a key to success in this course. We highly recommend a notebook or a three ring binder to keep up with all assignments, quizzes, homework and exams. For example, if there is a problem with the homework system and you can show me your work, I am able to give you credit.

Our goal is for you to be successful in this course. Please do not hesitate to come by the office for help. If the office hours conflict with your schedule, every effort will be made to arrange an alternative time. We cannot fix what we are not aware of so communication is a must. Please know that Canvas Email is the best way to get a quicker response since the office phone is not typically accessed from home after school hours.

### **Canvas:**

This course is available on Canvas and will contain all information necessary for the course. Canvas is also the method in which you will contact me, make any necessary appointments, receive announcements, take quizzes, do your homework, and watch screen casts. Please make sure you know how to use it. **Make sure you have the latest free download of adobe flash player.** There are canvas orientations through the distance learning office you may attend for assistance.

### **Course Grade:**

The grading scale for this course is as follows:

1. Homework and lecture activities 20%
2. Labs 25%
3. Unit Exams 40%
4. Final Exam 15%

Letter grades are as follows:

A	90 - 100
B	80 - 89
C	70 - 79
D	60 - 69
F	Below 60

**Texts, Materials, and Supplies:**

1. *Organic Chemistry 8th ed. By L.G. Wade*
2. Mastering Chemistry access code (homework registration necessary for online homework)
3. *Experiments in Organic Chemistry 3<sup>d</sup> ed. Richard K. Hill, John Barbaro*
4. *Laboratory Notebook*
5. SCIENTIFIC CALCULATOR (no cell phones) (it does NOT need to be graphing)

**Other:**

- For current texts and materials, use the following link to access bookstore listings: <http://www.panolacollegestore.com>
- For testing services, use the following link: <http://www.panola.edu/elearning/testing.html>
- If any student in this class has special classroom or testing needs because of a physical learning or emotional condition, please contact the ADA Student Coordinator in Support Services located in the Administration Building or go to <http://www.panola.edu/student-success/disability-support-services/> for more information.
- Withdrawing from a course is the student's responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.
- Student Handbook, *The Pathfinder*: <http://www.panola.edu/student-success/documents/pathfinder.pdf>