

Spring 2026 CHEM 232 Syllabus: Organic Chemistry for Molecular-Based Sciences: Part 2

Lecture:	MWF	10:00-10:50	FSB 544
Instructor:	Dr. Philip Albiniaak		
Office:	FSB 505		
E-mail:	paalbiniaak@bsu.edu		
Phone:	285-8183		
Office Hours:	M, W, F	11:00-12:30	

(contact me if these hours do not fit your schedule and you wish to schedule an appointment)

Course Description:

CHEM 232 is the second course in a two-semester sophomore level undergraduate sequence which focuses on introductory organic chemistry. This second semester will continue directly from CHEM 231 and will focus on reactivity of the common functional groups, an introduction to the spectroscopic techniques relevant to organic chemistry, and synthesis. This course is designed for chemistry majors, pre-professional majors requiring organic chemistry, and other molecular science-based majors. The prerequisite for this course is CHEM 231 with a final grade of C- or better. The co-requisite for this course is CHEM 242.

Texts & Supplies:

- Klein, Starkey Organic Chemistry, 5th edition, Wiley,
ISBN # 978-1-394-18936-6 (earlier editions are also suitable)

Strongly Recommended:

- Klein, Starkey Organic Chemistry Study Guide and Solutions Manual, 5th edition, Wiley,
ISBN # 978-1-394-32818-5
- Molecular Model Kit

Introduction: CHEM 232 is a direct continuation of CHEM 231. In that course you learned about the structure of organic compounds including skills such as: learning how to name organic structures, recognizing the various functional groups for organic compounds, understanding and applying fundamental bonding theories to understand the 3-dimensional shape of organic molecules, predicting the electron distribution about various organic structures, and manipulating organic structures to show and evaluate the various 3-dimensional shapes (conformations) that they can adopt. In the 2nd half of 231 the focus shifted to understanding and predicting the reactivity of organic compounds by learning the reactions and mechanisms of the various functional groups. ***It is critical that you have a solid understanding of these skills from 231 in order to be successful in this course!*** The study of reactivity will continue in CHEM 232. This semester will focus on the reactions and mechanisms of aromatic compounds, and the oxygen and nitrogen-containing functional groups. By the end of this year-long sequence, we should be able to convert any functional group into any other functional group. This is known as synthesis, and is one of the key responsibilities of organic chemists, taking small, inexpensive, readily available

chemical compounds and converting them through a series of reactions to make more expensive, rarer, more complicated and useful compounds. This semester will also expand the methods for making new carbon-carbon bonds to synthesize larger, more complicated organic structures. This semester will also introduce spectroscopy (IR and NMR), and you will learn how these techniques can be used to help identify chemical structures.

Outcomes: Upon completion of this course you should be able to:

- Recognize the common reactive functional groups and name simple organic compounds.
- Predict the outcome of potential reactions for the functional groups covered in 231 and 232. New functional groups covered in this term include: aromatic rings, ethers, epoxides, alcohols, thiols, sulfides, aldehydes, ketones, carboxylic acids and derivatives, and amines.
- Account for the bond-breaking and bond-making steps in various reactions for the functional groups discussed above by drawing curved arrow mechanisms to highlight the movement of electrons.
- Design multi-step syntheses to convert one functional group into another while increasing the complexity of the target product compound
- Use IR and NMR spectroscopy to elucidate the structure of chemical compounds

General Course Outline:

Chapter 17	Aromatic Compounds (Review)	Chapter 19	Aldehydes and Ketones
Chapter 18	Aromatic Substitutions	Chapter 20	Carboxylic Acids + Derivatives
Chapter 16	Conjugated Pi Systems	Chapter 21	Alpha Carbon: Enols/Enolates
Chapter 14	IR Spectroscopy	Chapter 22	Amines
Chapter 15	NMR Spectroscopy	Chapter 10	Radical Reactions
Chapter 12	Alcohols and Phenols		
Chapter 13	Ethers and Epoxides		

Course Materials:

All course syllabi, notes, handouts, and old handouts and test keys will be available on the course Blackboard site. Points accumulated for your final grade will consist of three quizzes, three in-class hourly exams, a comprehensive final, and several homework assignments. The nominal grade ranges for letter grades are shown below, but these may be modified slightly if appropriate.

Important Dates:

- January 12 Late Registration and Change-of-Course End
- January 30 Quiz 1
- February 06 Hour Exam 1
- February 27 Quiz 2
- March 13 Hour Exam 2
- March 19 Course Withdrawal Period End
- April 10 Quiz 3
- April 17 Hour Exam 3
- April 29 Final Exam (9:45 - 11:45 AM)

Grading:	Exam 1	150 points	A	≥ 88.0	(09.6%)
	Exam 2	150 points	A-	≥ 84.0	(08.2%)
	Exam 3	150 points	B+	≥ 80.0	(09.5%)
	Quizzes	150 points	B	≥ 76.0	(10.2%)
	Homework	200 points	B-	≥ 72.0	(11.5%)
	Evaluation	000 points	C+	≥ 68.0	(10.9%)
	Final Exam	<u>200 points</u>	C	≥ 64.0	(10.8%)
			C-	≥ 60.0	(10.2%)
	Total Available	1000 points	D+	≥ 56.0	(05.8%)
			D	≥ 50.0	(06.5%)
			F	< 50.0	(06.9%)

Homework: There will be several assigned group homework assignments handed out throughout the semester. Ultimately, you will turn in a single copy of the completed homework with all group members names included. However, working the assigned group homework alone is not enough preparation for the course, and I strongly recommend you work as many problems on a regular basis as possible. ***The most effective way to learn organic chemistry is through working problems regularly and keeping up with course material.*** The Klein text is well-organized with integrated problems within the chapter, as well as practice problems at the end of each chapter. You should work the in-chapter problems while you are reading each section to reinforce the concepts and ensure that you are completely understanding the principles before moving on. Once you feel comfortable with the skills in each section of the chapter, begin working on the integrated problems at the back of the chapter. In addition, the online Wiley+ website has many online problems worth practicing. We will be covering 12 chapters this semester in approximately 15 weeks. It is very important that you read the text regularly and have finished each chapter before we begin covering it in class. At the end of each class I will give you an idea of what we will be covering in lecture the following class. Please be diligent and stay current with the coursework as it is essential for doing well in organic chemistry, and it will be very difficult to catch up if you fall behind.

Attendance: Students are expected to attend all lectures. I will be taking attendance each class, but there are no points in the course directly associated with attendance. However, I strongly advise you to attend each and every class, because those that attend class do significantly better in the course than those that don't. Quizzes and exams given in the class cannot be made up if you are absent without contacting me before to make other arrangements. More importantly, organic chemistry is a different discipline than other science courses you have taken in the past, and requires a brand-new skill set. It is essential you attend class and keep up with the material as the course progresses as the material builds upon itself throughout the course.

Testing Policies:

- NO cell phones, PDA's, IPOD's, hats, headphones, etc. are to be on your person during quizzes or tests.
- *Only* TI-30x series calculators will be allowed on quizzes and exams.
- Errors in grading may occur from time to time. If you wish to have a question graded again, you must submit a written request to me in person detailing why you believe you deserve more credit along with the exam in question.

University Statement: We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse. If you need course adaptations or accommodations because of a disability, please contact the instructor of record as soon as possible. Ball State's [Disability Services](#) office coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability Services can be contacted at 765-285-5293 or dsd@bsu.edu.

Academic Misconduct: Academic misconduct including copying of another's work, falsification of data, cheating on quizzes or exams, or plagiarism will not be tolerated and will be handled according to University policy. You may use AI programs e.g. ChatGPT to help generate ideas, brainstorm, or get started on assignments. However, you should note that the material generated by these programs may be inaccurate, incomplete, or otherwise problematic. Beware that use may also stifle your own independent thinking and creativity. You may not submit any work generated by an AI program as your own. You must cite any AI-generated material that informed your work. Using an AI tool to generate content without proper attribution constitutes a violation of Ball State University's **Student Academic Ethics Policy**, <https://www.bsu.edu/about/administrativeoffices/vice-provost/student-services/academic-integrity>.