



Course Syllabus

Course Information

CHM 125 - General Chemistry I

4 Credit Hours

Online, Asynchronous

Instructor Information

Instructor Name

Email Address: fill-in

Phone: fill-in (optional)

Office Hours: fill-in (optional)

If you need to contact me directly, I prefer that you email me. Please allow 24 hours for me to respond to emails Monday through Friday and 48 hours on the weekend.

Communicating With the Instructor

When questions arise throughout the course, please remember to check the following resources for an answer before reaching out to me:

1. Course Syllabus
2. Announcements
3. The Question Center discussion board

Question Center Discussion

The Question Center Discussion is an excellent place to ask questions and get answers from peers and me. You are encouraged to post your questions here before contacting me unless it is a time-sensitive matter. If you have questions of a personal nature, such as relating to a personal emergency, questioning a grade on an assignment, or something else that needs to be communicated privately, you are welcome to contact me directly via email or phone.

Technology Help

If you have a question about the technology used in the course, please contact the Doane University Service Center for assistance; their contact information is listed later in the syllabus. If third-party tools are utilized in the course, please contact them directly.

Course Details

Catalog Description

Through lecture and lab experience, students will be exposed to and will demonstrate an understanding of basic concepts in chemistry such as nomenclature, stoichiometry, thermochemistry, the periodic table, the electronic structure, bonding, and the gas laws.

Course Prerequisites

Two years of high school algebra or any mathematics course numbered 100 or above.

Course Textbook and Materials

Required

Flowers, P., Theopold, K., Langley, R., Robinson, W. R. (2019). Chemistry 2e. OpenStax

- Textbook link: <https://openstax.org/books/chemistry-2e/pages/1-introduction>

Course Lab Kits

This course utilizes a lab kit from our educational partner, **Science Interactive**. You will be required to complete both virtual and hands-on lab activities. The course includes instructions on how to order the voucher for the lab kit.

Required Technology

- Canvas
- Science Interactive
- WileyPlus (Knewton Alta)

Course books and materials can be purchased at [Doane Online Bookstore via eFollet](#). Select this course from the dropdown menu.

Learning Objectives and Course Outline

Course Objectives

By the end of the course, you will be able to:



1. Use proper chemical terminology to describe chemical systems and processes.
2. Apply atomic/electronic structure to periodic table relationships and molecular bonding and structure.
3. Use basic quantitative reasoning, such as dimensional analysis, proportional reasoning, and algebraic manipulation, applied in chemistry – solution concentration, stoichiometry, thermochemistry, and gas behavior.
4. Properly represent and evaluate basic chemical reactions in symbols, including precipitation, acid-base, and oxidation-reduction reactions.
5. Apply the scientific method through hands-on laboratory experiments, following proper laboratory protocol and techniques.

Course Outline

Module	Topic	Aligned Objectives
1	Atoms, Molecules, and Ions	1.1 Classify properties as either Intensive or extensive - Chemical or physical 1.2 Describe the properties of and classify different phases of matter 1.3 Classify changes as either physical or chemical 1.4 Classify matter based on its composition 1.5 Convert between scientific and numerical notations 1.6 Discuss the types of errors in measurements and the confidence in a measurement based on the accuracy and precision of the data 1.7 Provide the correct number of significant figures for a given mathematical operation 1.8 Convert between units using dimensional analysis 1.9 Describe the properties of subatomic particles including the location, charge and relative size/mass 1.10 Describe the structure of an atom and determine the number of subatomic particles for a particular isotope 1.11 Calculate the average atomic mass or information about a particular isotope
2	Composition of Substances and Solutions	2.1 Identify ionic and molecular compounds 2.2 Build and dissociate ionic compounds 2.3 Convert between chemical symbols/formulas and chemical names 2.4 Calculate a formula mass from atomic masses

Module	Topic	Aligned Objectives
		<p>2.5 Use Avagadro's number to convert between number of things and moles</p> <p>2.6 Use a molar mass to convert between moles and mass</p> <p>2.7 Calculate empirical formulas and convert between empirical and molecular formulas</p> <p>2.8 Calculate a solution's concentration in molarity and use molarity to convert between moles and volume using molarity</p> <p>2.9 Use $M_1V_1 = M_2V_2$ to solve dilution problems</p>
3	Stoichiometry of Chemical Reactions	<p>3.1 Balance chemical equations</p> <p>3.2 Write out a metathesis (precipitation) reaction and determine whether an ionic compound is soluble or insoluble</p> <p>3.3 Breakdown a precipitation reaction into complete ionic and net ionic equations</p> <p>3.4 Write out a neutralization and combustion reactions</p> <p>3.5 Determine the species being oxidized and reduced in a redox reaction using oxidation numbers</p> <p>3.6 Use stoichiometry to convert the amount of reactants and products</p> <p>3.7 Determine the limiting and excess reagents and use the limiting reagent to answer questions about the extent of a reaction</p> <p>3.8 Calculate a percent yield</p>
4	Thermochemistry	<p>4.1 Define a thermodynamic process as exothermic or endothermic</p> <p>4.2 Use the first law of thermodynamics to describe heat flow between the system and surroundings</p> <p>4.3 Use heat capacity equations to convert between heat and temperature change</p> <p>4.4 Use the specific heat equation and the first law of thermodynamics to calculate the initial temperature of a hot or cold object in a calorimetry experiment</p> <p>4.5 Describe the defining characteristics of a state function and determine whether a function is a state functions</p> <p>4.6 Use a thermochemical equation to determine the amount of heat released or absorbed for a given amount of reactants consumed or products formed</p>

Module	Topic	Aligned Objectives
		<p>4.7 Use Hess's Law to determine the enthalpy of a reaction given thermochemical equations of individual steps in the reaction</p> <p>4.8 Determine the enthalpy of a reaction given the enthalpies of formation for the reactants and products</p>
5	Electron Structure and Periodic Properties of Elements	<p>5.1 Convert between frequency, wavelength, and the energy of light</p> <p>5.2 Discuss what the Bohr model correctly and incorrectly predicted</p> <p>5.3 Describe what the four quantum numbers dictate for a given electron and determine the number of orbitals or electrons that can have a particular set of quantum numbers</p> <p>5.4 Draw s, p, and d orbitals and read radial distribution functions</p> <p>5.5 Draw an orbital diagram for a given element or ion</p> <p>5.6 Write out full and condensed electron configurations for a particular element or ion</p> <p>5.7 Discuss why orbitals are filled in the way that they are</p> <p>5.8 Describe and use periodic trends in Zeff, atomic radius, and ionization energy</p>
6	Chemical Bonding and Lewis Structures	<p>6.1 Write out Lewis symbols for main group elements</p> <p>6.2 Describe what constitutes ionic and covalent bonds and use periodic trends to predict an atom's bonding nature</p> <p>6.3 Draw Lewis structures for molecular compounds and polyatomic ions</p> <p>6.4 Draw individual resonance structures and the hybridized resonance structure</p> <p>6.5 Calculate formal charges and use them to determine the best Lewis structure for molecular compounds and polyatomic ions</p> <p>6.6 Relate bond strength, bond length, and bond enthalpy</p> <p>6.7 Calculate the enthalpy of a reaction based on the bond enthalpies for the broken and formed covalent bonds</p> <p>6.8 Draw Lewis structures for molecules that do not obey the octet rule.</p>

Module	Topic	Aligned Objectives
7	VSEPR Theory and Molecular Geometry	7.1 Determine the electron domain geometry and the molecular geometry of molecular compounds and polyatomic ions 7.2 Determine if a molecule is polar or nonpolar 7.3 Describe covalent bonds through valence bond theory 7.4 Determine the hybrid orbitals used for bonding based on a Lewis Structure 7.5 Fill the hybrid orbitals and potentially any remaining atomic orbitals with electrons based on molecule's Lewis structure
8	Gasses	8.1 Calculate the pressure of a gas based on manometer data 8.2 Use the gas laws to describe the relationship between P, V, n, T and use these laws to convert between these functions 8.3 Describe how collisions between gas molecules and surface influence the pressure of a gas 8.4 Use gas laws to calculate gas density and molar mass of gasses 8.5 Calculate the partial pressure of an individual gas and calculate the total pressure of a system of multiple gasses 8.6 Define vapor pressure and discuss the parameters that influence vapor pressure 8.7 Use the Van der Waals equation to calculate the properties of non-ideal gasses

Course Requirements

This is an online course, and there will **not be any face-to-face class sessions**. All communications, submissions of assignments, course interactions, and posting of grades will utilize Canvas LMS (<https://doane.instructure.com>). You must have a **reliable internet connection** throughout the course.

Attendance/Participation

Attendance in an online course means logging into Canvas regularly and participating in all the activities posted in the course. In addition, check your Doane University email account regularly, as I may send important information about the course.



Class Preparation

Preparation for class means reading the assigned readings and reviewing all information required for that module. You should plan to work on this course every day. Regular engagement is expected for online courses.

Netiquette Guidelines

At heart, netiquette (etiquette for the Internet) is simple, including good manners and business courtesy. Some of it may seem basic, but some infringements can result in major problems for others or create an unintended insult to another user. The guidelines are adapted from Virginia Shea's *The Core Rules of Netiquette* (1994). Please review the [Netiquette Guidelines](#) in the Student Resource Center for more information.

Computer Requirements

To successfully use Canvas, please refer to Doane University's [minimum computer requirements](#). This also includes:

- Reliable computer and internet connection
- A web browser (Chrome or Mozilla Firefox)
- Adobe Acrobat Reader (free)
- Word processing software—Microsoft Word or Google Docs

Campus Network or Canvas Outage

When access to Canvas is not available for an extended period of time (greater than one entire evening - 6 pm until 11 pm), you can reasonably expect that the due date for assignments will be changed to the next day.

Drop and Add Dates

If you feel it necessary to withdraw from the course, please contact your advisor for full details on the types of withdrawals available and their procedures.

Federal requirements state that students must complete 75% of the coursework to be eligible to receive an incomplete for the course. Students who fall more than two weeks behind cannot meet this requirement.

Access to Course

You can access the course in Canvas starting from the first day of the course and for 15 days after the term ends. If you need access beyond those 15 days, you must submit a request with a valid reason, which the administration must approve.



Academic Integrity

Fundamental to our mission, core values, and reputation, Doane University adheres to high academic standards. Students of Doane University are expected to conduct themselves in a manner reflecting personal and professional integrity. Disciplinary actions may be taken against students whose academic behavior is not congruent with the expectations of the University. Students are responsible for adhering to the standards detailed in this policy. Not being familiar with these standards does not mean that the students will not be accountable for adherence to them. Additional details on the Academic Integrity policy for violating academic integrity are published in the undergraduate and graduate catalogs. Please review [Doane University's Academic Integrity Policy](#).

Course Grading

Submitting Assignments

Unless otherwise communicated to me, all assignments must be submitted via Canvas. Each assignment will have a designated place to submit your work. All materials, assignments, and deadlines are subject to change without prior notice. You are responsible for staying in touch with me and reviewing the course site, including Announcements, regularly to learn about changes to assignments or due dates.

Grading Scale (determined by faculty, may include + and -)

Assignment of letter grades is based on a percentage of points earned. The letter grade will correspond with the following percentages achieved. All course requirements must be completed before a grade is assigned.

A 100 – 90%

B 89 – 80%

C 79 - 70%

D 69 - 60%

F < 60%

Grading Scheme

The following outlines the weighted breakdown for how grades will be calculated:

Assignments – TBD

Discussions – TBD

Quizzes – TBD



Final Exam – TBD

Tutor Me

Students can access a **free online tutoring service** within their Canvas account. You can connect with a live free tutor or submit a paper to get feedback before submitting.

Proctored Assessments

This course **may contain proctored quizzes and exams, which are not optional**. For these proctored events, Doane uses YuJa Verity, a secure, online proctoring service that allows you to complete your exam from any chosen location at any time. Proctoring assures your instructor that any suspicious activity by test takers will be monitored and reported. The cost of the proctoring is included in the tuition and fees for this course.

Late or Missed Assignments

All assignments and labs must be completed and turned in to finish the course. Unless you discuss a late assignment with me before the assignment due date, your assignment will lose 20% each day it is late.

Assignment & Assessment Feedback

Please allow 1-3 days for feedback on assignments. Be sure to review all of my feedback, as this will help you reflect on what you have learned while receiving suggestions for improvement.

Grade Appeals

Students who believe that their grade was miscalculated due to a mathematical error should contact the instructor within **ten (10) days of the grade posting**. Students are encouraged to talk with their advisor to offer an assessment of the concern and clarify the steps of the appeal process. More information is published in the [Undergraduate and Graduate Catalogs](#).

Support and Services

Technical Support

If you need technical assistance, please access the [Self-Service Portal](#). The help desk can be reached at 402-826-8411 or by email at helpdesk@doane.edu.



Accessibility Statement

In compliance with the Rehabilitation Act of 1973, Section 504, and the Americans with Disabilities Act of 1990, professional disability specialists and support staff at Doane University facilitate a comprehensive range of academic support services and accommodations for qualified students with disabilities. Doane University staff coordinate student transitions from high schools and community colleges, conduct in-service training for faculty and staff, enable the resolution of accessibility issues, conduct community outreach, and facilitate collaboration among Doane University staff on disability policies, procedures, and accommodations.

Accommodations & Disability Services

[Doane University's Disability Services Office](#) will guide accommodations and universal access. To request accommodation, please complete the [Self-Identification Form](#) and visit the website for additional information as soon as possible.

Academic Support

Doane University offers all of its students access to [Academic Support](#) services.

Title IX Requirements: Mandatory Reporting

At Doane, all university employees, including faculty, are considered Mandatory Reporters. As a Mandatory Reporter, I am required to report incidents of sexual misconduct and relationship violence to the Title IX Coordinator and, thus, cannot guarantee confidentiality. This means that if you tell me about an incident of sexual harassment, sexual assault, domestic violence, dating violence, stalking, and/or other forms of prohibited discrimination, I have to share the information with the University's Title IX Coordinator. My report does not mean that you are officially reporting the incident. This process is in place to ensure you have access to and are able to receive the support and resources you need. Please visit the [Campus Advocacy, Prevention, and Education \(CAPE\) Project](#) for additional information, including confidential resources.

Anti-Harassment Policy

Doane University, referred to as the "University," is committed to providing all University community members with a safe and non-discriminatory learning, living, and working environment. This policy addresses the University's responsibilities under Title IX, the Violence Against Women Reauthorization Act of 2013, and the Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act ("Clery Act"). More information is published in the [Student Handbooks](#).



Instructional Technology Accessibility and Privacy Policies

[Technology accessibility and privacy policies](#) are available on the Student Resource Center within the Canvas LMS.

Syllabus Addendum & Disclaimer

I (the instructor) view the course syllabus as an educational contract between myself and each student. Every effort will be made to avoid changing the course schedule, but unforeseen events may make syllabus changes necessary. I reserve the right to make changes to the syllabus as deemed necessary. Students will be notified promptly of any syllabus changes via email or course site announcements. Please check your Doane University email and the course site announcements often.

Syllabus Changes

The instructor and Doane University reserve the right to change this course syllabus. All students will be notified of any changes.

Syllabus Addendum

Each student is responsible for knowing the policies, resources, and expectations specified in the [Doane Syllabus Addendum](#).

