



Fundamentals of Chemistry

CEM131.H50

Fall 2019

Number of Credits: 4

Instructor: John Ireland, Ph.D.

Days Class Meets: M/T/W/R (9/4-10/21)

Office: JM136A (Main)

Meeting Times: Lec. 9-10:55 (M/W)

Contact Phone: NA

Lab: 9-10:55 (T/R)

Contact Email: irelandjohn@jccmi.edu

Location: 233 (Lecture), 233 (Lab)

Office Hours: See JetNet

Online: See JetNet

Course Description

Fills requirement for some non-science majors. Provides background for CEM 141 for those with no recent high school chemistry. Fundamental principles of chemistry such as states of matter, simple atomic and molecular structure, and the periodic classification of elements. The study of water emphasizes the properties of solutions and acid-base relations. Course includes a laboratory component.

Prerequisite(s)

ENG085 and MAT031 or Higher

Course Goals

This is a college non-majors laboratory science course. It requires college level reading of significant length and on demand proficiency with basic college mathematics (calculators are allowed). Significant practice outside of class is essential to success and usually requires a minimum of two hours outside of class for every hour in class (for average students). The biggest challenges for most students are the pace of the course and the use of mathematics in a practical sense (word problems).

Course Objectives

The course goals and objectives incorporate specific General Education Outcomes (GEOs) established by the JC Board of Trustees, administration, and faculty. These goals are in concert with four-year colleges and universities and reflect input from the professional communities we serve. GEOs guarantee students

achieve goals necessary for graduation credit, transferability, and professional skills needed in many certification programs. The GEO addressed in this class is GEO 4: Scientific Reasoning.

Textbook

- OpenStax Atoms First Chemistry Text

The text for this course is an abridged version of the OpenStax Atoms First Chemistry text found at <https://openstax.org/details/books/chemistry-atoms-first>,

Text Book Zero: This course uses OER.

Extras

- Lab Safety Goggles
- Lab Safety Apron
- Closed Toed Shoes for lab
- A Basic Scientific Calculator (the TI calculator from your math class is fine too, but your phone can not be used as your calculator)

Grading Procedure

Grading is based on the percentage of the total points possible that you earn (calculated to one decimal point). There are a variety of assessments, but NO EXTRA CREDIT, so work hard on each assessment.

Assessments	Points Each	Number	Points Total	Drops	Grade %
Final Exam	60	1	60	NA	7
Expectations of the Class	10	1	10	NA	1
Lab Safety	10	1	10	NA	1
Online Unit Summative	60	5	240	1	28
In-Class Unit Summative	40	5	160	1	19
Chapter Pretests	5	13	60	1	7
Post-Chapter Formatives	10	12	110	1	13
Lab Entry Ticket	4	14	52	1	6
Lab Reports	10	14	130	1	16
Attendance Questions	2	13	24	1	3
Totals			856		

Grading Scale

Grade	Percentage
4.0	100.0-90.0
3.5	89.9-85.0
3.0	84.9-80.0
2.5	79.9-75.0
2.0	74.9-70.0
1.5	69.9-65.0
1.0	64.9-60.0
0.5	59.5-55.0
0.0	54.9-0.0

All grades are calculated to the first decimal point

Failure

The following conditions can lead to failure of the course, regardless of the grade. All of these indicate significant deficiencies in outcomes or deficiencies in attendance.

- Failure to achieve a 2.0 grade on any summative assessments in the course.
- Failure to achieve a 2.0 grade on either the Lecture or Lab Assessment groups overall, regardless of the other group grade.

Accelerated Hybrid Course

Jackson College has decided, as a policy, to transition a large percentage of courses to a seven-week accelerated hybrid course design. Hybrid courses that require a significant amount of learning to be accomplished outside of class time instruction, with materials provided in an online setting. Computer failure, other than officially noted outages by Jackson College, will not be considered in incomplete or late work/assignments. All assessments have an open time window, so official outages at exactly the due time will be weighed little for late work. The course is designed such that students are expected to have completed assigned readings and/or assessments prior to the class they are due on and does not operate independently as a face-to-face course.

Academic Honesty Policy

Academic Honesty is defined as ethical behavior that includes student production of their own work and not representing others' work as their own, by cheating or by helping others to do so.

Plagiarism is defined as the failure to give credit for the use of material from outside sources.

Plagiarism includes but is not limited to:

- Submitting other's work as your own
- Using data, illustrations, pictures, quotations, or paraphrases from other sources without adequate documentation
- Reusing significant, identical or nearly identical portions of one's own prior work without acknowledging that one is doing so or without citing this original work (self-plagiarism)

Cheating is defined as obtaining answers/material from an outside source without authorization.

Cheating includes, but is not limited to:

- Plagiarizing in any form
- Using notes/books/electronic material without authorization
- Copying
- Submitting others' work as your own or submitting your work for others
- Altering graded work
- Falsifying data
- Exhibiting other behaviors generally considered unethical
- Allowing your work to be submitted by others

Course Management

Under extraordinary circumstances, a student can request as Incomplete, to be completed in a timely fashion after the end of the normal term. Incompletes are governed by the JC Policy on Incomplete grades (see [JC Policy page](#) on the JC website) and are only given if a small percentage of work is left incomplete, the student is currently passing the class when they request the incomplete, and there is a reasonable expectation the work can be completed within the next term.

Students that have medical issues during the term should discuss the possibility of a medical withdrawal from the course with the Admissions Office.

Makeup Policy

There are no make-up laboratories granted in this class due to the nature of work done. Exams are generally not available for make-up, but under extraordinary circumstances, alternative times prior to the original time may be arranged **at the discretion of the instructor**. Note, prior planned travel (i.e. leaving for a vacation early) is NOT considered a legitimate reason for alternative times.

Help

Available learning services or opportunities for students seeking help with their course work. May include information about tutors, learning centers, reserved library materials, open labs, counseling services.

It is important to contact a Center for Student Success professional prior to the start of the semester in order to receive accommodations in a timely manner. While we will make every effort to coordinate accommodations in a timely manner, failure to self-identify prior to the start of the semester may delay notification to instructors and timeliness of acquiring accommodations. Accommodations do not automatically carry over to the next semester.

<https://www.jccmi.edu/center-for-student-success/accommodations-for-students-with-disabilities/>

Student Responsibilities

Regular attendance and participation is required for successful completion. This class will also require considerable out of classroom study, assessment, reading, and practice. There are no extra-credit assignments. **The class also requires assessments and assignments to be completed outside of class on JetNet, these are REQUIRED and have firm deadlines.**

Attendance Policy

In compliance with Federal Title IV funding requirements, as well as college initiatives, reporting of student participation in classes will occur at three designated times each semester. Instructors will assign one of three non-transcript letter symbols to each student during each reporting period (see below). Students identified as no longer participating will be dropped or administratively withdrawn from the class, and students identified as needing academic assistance will be contacted.

Attendance is monitored using a simple question (free response) at the end of each period. You will enter the question on your phone/computer and each one will be worth two (2) points, with the lowest one dropped.

Reasons for Being Dropped from the Course

There are various reasons why you will be dropped from the class, below is a list of the common reasons (though it is not exhaustive):

- You fail to show for the first week of class and do not contact me.
- You fail to attend for five class sessions with explanation offered to me.
- You fail to attend three laboratories
- You fail to take two exams.

If any of these conditions are met you will be dropped from the course (in addition, you will not be reinstated, which I must sign off on).

Unit Summative Assessments (“Exams”)

Each of the five content units has a comprehensive summative assessment. The unit assessments will be broken into two parts, an online section (60%) dealing with low to mid-level Bloom's taxonomy questions about the material and an in-class section (40%) dealing with the problem solving and concept integration level material.

Online Summative Assessment

The online summative assessments will be timed exams in JetNet using multiple choice, true/false, and similar styles. The purpose of these assessments is to judge the low to mid-level integration of material from the unit. Common things that will be assessed is terminology comprehension, basic mathematical relationship understanding, and single concept integration. The assessments will be sixty questions each, randomly chosen from a database of one-hundred questions. Two tries at the assessment will be allowed with reshuffling of the material between attempts. The higher of the two scores will be recorded. The lowest assessment in this category will be dropped before the final grade is calculated.

In-Class Summative Assessment

The process by which mathematical reasoning is accomplished in Chemistry is just as important as the final answer, so there will be an in-class summative assessment for each of the content units. The purpose of these assessments is to judge the ability of the student to mathematically apply the concepts of chemistry to problems and to demonstrate mid to high-level concept integration. Common things that will be assessed are the application of mathematical formula and relationships to chemical scenarios, multiple concept integration, and graphical interpretation. The assessments will be broken into two section, each worth twenty points. The first section will be problems focused at mid-level understanding (typically using two-three specific learning outcomes) and consist 11 questions (each worth two points). The second section will be problems focused on upper-mid to high-level integration (using three or more specific outcomes) and consist of six questions (each worth four points). The student will have the option to skip one question in each section or attempt all questions (and the lowest scoring question in each section will be dropped). The lowest in-class summative assessment will be dropped before the final grade is calculated.

Unit Formative Assessments

Chapter Pretest

This is an online questionnaire to be filled out by the students prior to each class week. The questionnaire is composed of multiple choice based question geared towards each of the specific learning outcomes scheduled for the upcoming face-to-face meeting. Each content question will be paired with a lexical question asking the student to rate their "confidence" in the answer they just gave. The questionnaire is not timed and is scored solely on participation. The point of the assessment is to create a dashboard for each outcome so that the instructor can engineer in-class activities to reinforce the concepts that show the weakest results (either in content mastery or overall student confidence). The lowest Entry Ticket score will be dropped before the final grade is calculated.

Post-Chapter Formative Assessment

This is an online graded set of ten machine-gradable questions that will be taken in a timed format with two attempts (questions reshuffled between attempts from a bank of questions) to assess integration of the concepts just covered in class at the low to mid-level of integration. The assessment must be finished by 11:59PM on the Sunday after a week of lecture. The lowest Post-Class Formative Assessment score will be dropped before the final grade is calculated.

Laboratory Activities

Each lab will have two components, an online pre-laboratory entry ticket and a lab report for the lab exercise itself.

Lab Entry Ticket

This is an online form that has to be submitted via JetNet prior to the start of lab. The student will not be allowed to participate in lab if they have not completed the form and submitted it. The form will be four short answer questions that deal with aspects of the experimental design, mathematical concepts used, and/or the references values needed. The purpose of the Lab Entry Ticket is to hold the student responsible for reviewing the experiment before coming to the lab, so that they can be informed of the needed work to be completed. Lab entry is granted upon completion of the Lab Entry Ticket, but the answers are graded for accuracy also. The lowest Lab Entry Ticket score will be dropped before the final grade is calculated.

Lab Report

This is a hard-copy data, calculations, and discussion report collected in lab. The lab exercises are mainly done on a bench group design (minimize overall waste generation) and instructor control is required to minimize "free rider" effects. The labs vary in the exact reporting requirements depending on the experiment but are focused on reinforcing specific outcomes from contemporaneous lecture activities.

Final Exam

American Chemical Society nationally standardized final for non-majors Introductory Chemistry. The exam is a sixty-question multiple choice exam with computational problems integrated into the exam. The exam is taken in person as the control of the exam copies is essential (as per ACS guidelines). This exam is used across all sections as a way to standardize section outcomes.

Caveat

All policies above are subject to change, with notice, by the instructor for reasons the instructor deems necessary (pedagogical issues, school closings, illness of the instructor, etc.).

Calendar

**all dates below are subject to change by the instructor with prior notice, at least one week in the case of major assessments (such as exams).*

Week	Starting Day	Chapters to Cover	Lab Day	Lab	Summative
1	9/3	Chapter 1	9/5	No Lab (Hybrid Overview)/Chap. 1	
2	9/9	Chapter 2	9/10	Lab 1- Density and Graphing	
	9/11	Exam 1/ Chapter 3	9/12	Lab 2- Phase Change and States of Matter	Chap. 1/2
3	9/16	Chapter 3/4	9/17	In Service Day (no classes)	
	9/18	Chapter 4	9/19	Lab 3- Emission Spectrum	Chap. 3/4
4	9/23	Exam 2/ Chapter 6	9/24	Lab 4- Nomenclature Dry Lab*	
	9/25	Chapter 6/7	9/26	Lab 5- Hydration Number of a Salt	
5	9/30	Chapter 7	9/30	Lab 6- Chemical Reactions	Chap. 6/7
	10/2	Exam 3/ Chapter 8	10/3	Lab 7- Molar Mass of Butane	
6	10/7	Chapter 8/9	10/8	Lab 8- Specific Heat of a Metal	
	10/9	Chapter 9/10	10/10	Lab 9- Hardness of Water	Chap. 8-10
7	10/14	Chapter 11/13	10/15	Lab 10- Titration of Acids and Bases	
	10/16	Chapter 14	10/17	Lab 11- Radioactivity*	Chap. 11-14
8	10/21	Final Exam			

*These labs are considered for floats, labs that can be replaced with other wet labs or can be transitioned to out-of-lab exercises to account for missed days (snow days, instructor absence, etc.)