CEM 121: Explorations in Chemistry – Fall 2016

Course Overview

Catalog Description
Introduction to core ideas in chemistry (structure and properties of matter, energy, and electrical forces) blended with science practices (use of models, argumentation, construction of scientific explanations, mathematical thinking) to understand and explain chemical phenomena.

Course Units
Unit 1 – Particle Models for Matter, Motion, and Phase Changes
Unit 2 – Atoms and the Periodic Table
Unit 3 – Molecules and Bonding
Unit 4 – Chemical Reactions

People

Instructors
Dr. Lynmarie A. Posey
   email: poseyl@msu.edu; office: 61 Chemistry; phone: 517-353-1193

Dr. Rebecca Matz
   email: matz@msu.edu; office: 115B Erickson; phone: 517-353-2958

Note: When sending email, please use your MSU email account and include “CEM 121” in the subject line.

Learning Assistants
Josh Abatie, abatiejo@msu.edu (Section 003)
Megan Campbell, campb779@msu.edu (Sections 001 and 004)
Jon Kremer, kremerj3@msu.edu (Section 002)

Schedule

Weekly Class Schedule

Sections 001 & 002  Sections 003 & 004
Lecture: MWF 10:20 – 11:10 AM  Lecture: MWF 1:50 – 2:40 PM
Recitations:  Recitations:
   Section 001: Tu 7:00–7:50 PM  Section 003: W 3:00–3:50 PM
   Section 002: Th 3:00 PM–3:50 PM  Section 004: W 7:00 PM–7:50 PM

Lectures and recitations meet in 323 Chemistry.

Recitations will begin the week of September 5. Recitations will not meet during Thanksgiving week.
Instructor Office Hours

Office hours will begin the week of September 5th.

   Dr. Posey, M 11:20 AM–12:20 PM, Th 4:00–5:00 PM, and other times by appointment in 61 Chemistry

   Dr. Matz, W 11:20 AM–12:20 PM in 485E Chemistry, F 8:30 AM–10:00AM in 115B Erickson (CREATE for STEM Institute) and other times by appointment in 115B Erickson or virtually

You are welcome to attend the office hours of either instructor independent of the section in which you are enrolled. Any changes to the office hour schedule will be announced in advance as “News” in Desire2Learn (D2L) (https://d2l.msu.edu).

Learning Assistant Office Hours

   TBD, schedule will be provided in D2L.

Important Dates*

<table>
<thead>
<tr>
<th>Important Dates</th>
<th>Event</th>
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<tbody>
<tr>
<td>Monday, September 26, 7:15–8:15 PM</td>
<td>Test #1</td>
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<tr>
<td>Monday, October 17, 7:15–8:15 PM</td>
<td>Test #2</td>
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<tr>
<td>Wednesday, October 19, 8 PM</td>
<td>Last day to drop with no grade reported</td>
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<tr>
<td>Monday, November 7, 7:15–8:15 PM</td>
<td>Test #3</td>
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<tr>
<td>Monday, December 5, 7:15–8:15 PM</td>
<td>Test #4</td>
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<tr>
<td>Wednesday, December 14, 12:45–2:45 PM</td>
<td>Final Exam</td>
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*Test and final exam dates are fixed.

Announcements & Reminders

Course announcements will be posted as “News” in D2L (https://d2l.msu.edu). Reminders of test and final exam dates can also be found on the D2L Calendar.

Outcomes, Objectives, & Expectations

Overall Course Learning Outcomes:

Students will

- develop their understanding of several core ideas in chemistry (the structure and properties of matter and the role of electrical forces) and their ability to apply these ideas to explain chemical phenomena.
- build capacity to engage with the scientific practices of using models, constructing scientific explanations, engaging in argumentation, and applying mathematical thinking.


• build a robust, transferrable understanding of core ideas in chemistry through integration with science practices to support learning in subsequent chemistry and other gateway science courses.
• develop proficiency and gain confidence in applying appropriate mathematics in chemistry, including the use of graphs, proportional reasoning, and covariance.

Learning Objectives

Specific learning objectives for each course unit will be provided in D2L. Taken together, the learning objectives detail what you should know, understand, and be able to do. As such, they can be used as a study guide when preparing for tests and the final exam as well as a self-assessment tool.

Alignment of CEM 121 with MSU’s Undergraduate Learning Goals

CEM 121 will provide students with ample opportunities to develop, apply, and refine their use of analytical thinking in the context of chemistry. The analytical thinking component of MSU’s Undergraduate Learning Goals encompasses acquisition of information coupled with critical analysis “to evaluate evidence, construct reasoned arguments, and communicate inferences and conclusions.” Specifically, this course will focus on

• synthesis and application of information and methods from the discipline of chemistry to develop an understanding of the structure and properties of matter and the governing role of electrical forces.
• identification and application of appropriate quantitative methods.

Teaching Philosophy and Expectation for Roles

We will serve as your coaches and guides as you learn to use models and apply ideas in chemistry to understand and explain the structure and properties of matter. As your coaches, we are responsible for setting up a training program to help you build your understanding of chemistry. Constructing knowledge is analogous to building muscle memory in sports; it doesn’t happen without practice and repetition. (The people that you consider experts got there through practice and persistence, not because they started with special abilities. Most experts will tell you that they had failures along the way, but they didn’t give up.) In order to support your learning of new material, you will be given a variety of tasks both during class and outside of class that will require you to use new knowledge and skills. Do not be afraid to ask questions. Both lecture and recitation meetings will be guided by the motto “less talking from the front of the room, more talking and doing all around.”

Course Materials

Required Materials

- Computer with Internet access (DSL, LAN, or cable connection desirable)
- Scientific calculator

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1 Undergraduate Learning Goals developed by MSU’s University Committee on Liberal Learning, http://undergrad.msu.edu/programs/learninggoals


Instructor-Provided Course Materials

Course materials will be published in the Desire2Learn (D2L) course management system (https://d2l.msu.edu). Assistance with D2L is available 24/7 through MSU Distance Learning Services (aka. the Help Desk) at (517) 432-6200 or (844) 678-6200.

Access to the online beSocratic system for homework will be provided at no cost.

A composition book will be provided for developing your Chemistry Toolbox (see below).

Commercialization of Course Materials

MSU prohibits students from commercializing their notes of lectures and University-provided class materials without the written consent of the instructor. The instructor and Michigan State University retain copyright to all materials provided in this course unless otherwise indicated.

Grading

Grading Criteria

The grade in this course will be based on

- Four tests (10% each) 40%
- Final exam 15%
- In-class assignments/projects 15%
- Recitations 10%
- Homework (beSocratic) 10%
- Toolbox/Quizzes 10%

Grading Scale

The following fixed grading scale will be used to determine semester grades:

≥ 90% 4.0; 85–89% 3.5; 80–84% 3.0; 75–79% 2.5; 70–74% 2.0; 65–69% 1.5; 60–64% 1.0; < 60% 0.0

Standard rounding rules apply. The instructors reserve the right to adjust the grading scale downward, but under no circumstances will the criterion for any grade be raised. Everyone has an opportunity to earn a grade of 4.0 in this course.

The deadline for reporting grade discrepancies and requesting regrades is 5 PM on Friday, December 9, 2016.

Tests

Four closed-book tests will be given on Monday evenings, 9/26, 10/17, 11/7, and 12/5, 7:15-8:15 PM. Equations and other useful information (periodic table, physical constants, etc.) will be provided when necessary. Sample equation sheets will be published in advance. Scientific calculators are the only electronic devices that may be used during tests and the final exam. Accessing a cell phone, tablet, MP3 player, or computer during a test or the final exam is considered use of unauthorized materials and will result in assignment of a penalty grade and filing of an Academic Dishonesty Report.
Make-up tests **will not** be given. In the event of a missed test with an excused absence approved **in advance**, the weighted final exam score will be used in place of one missed test. For a second missed test, a grade of zero will be used in computing the semester grade. If your final exam percentage score is higher than your lowest test score, it will be substituted for your lowest test score.

**Final Exam**

A cumulative final exam will be given on **Wednesday, December 14, 12:45–2:45 PM for all sections**. Students in Sections 003 and 004 are encouraged to take the final exam on Wednesday, December 14, 12:45–2:45 PM rather than as scheduled on Monday, December 12, 12:45 – 2:45 PM, which is only 45 minutes after the MTH 103 exam ends. Students in Sections 003 and 004 who have another exam which conflicts the Wednesday exam time will be accommodated.

Students are reminded of the following University policy outlined in *Academic Programs*:

*A student absent from a final examination without a satisfactory explanation will receive a grade of 0.0 on the numerical system, NC on the CR-NC system, or N in the case of a course authorized for grading on the P-N system. Students unable to take a final examination because of illness or other reason over which they have no control should notify the associate deans of their colleges immediately.*

**In-Class Assignments/Projects**

You will be asked to do work during most class meetings. Class work may include completion of worksheets, responses to lecture questions, and group project work. Most of the time, you will collaborate with members of your group to complete this work. From time to time, you will be asked to do an in-class activity on your own. Please participate with an open mind, be willing to share your ideas, and be respectful of the ideas of others. This work will provide formative assessment for both student and instructor and is intended to help you begin to synthesize and apply course content knowledge. You will receive full credit for making a good effort to complete the in-class work. Note that your answers for the in-class work do not have to be 100% correct to receive full credit (5 points); however, incomplete work will only receive partial credit (3 points or 1 point). Every member of a group will receive the same credit for any in-class work completed as a group. Guidelines for projects will be provided separately.

**Recitations**

Recitations meet weekly, except during the first week of the semester and Thanksgiving week. **Recitations begin on September 6**. Recitation time will be used for activities, content, group project work, and quizzes. Recitations also provide an opportunity to ask questions about anything related to the course.

Attendance is expected at all recitations. Attendance and participation in recitation will count for 10% of your semester grade. Content missed because of failure to attend a recitation session cannot be made up, unless **PRIOR** arrangements have been made with the learning assistant in charge of your recitation or one of the course instructors.
Homework

Homework in this course will consist primarily of activities in the beSocratic online assessment system. However, you will also be asked to answer questions in the Qualtrics survey system as homework from time to time. Homework will be assigned 2 or 3 times each week to coincide with the coverage of material in class.

There are a few things that you should keep in mind when completing activities in beSocratic. You should work on these activities independently without consulting outside resources, such as books, the web, or friends. It is fine to consult notes that you have taken in class and to use answering questions in beSocratic as an opportunity to revise and refine your notes. The goal is for you to practice constructing answers based on your current understanding, which will become more correct over time. Simply copying down someone else’s ideas has little benefit for your learning.

We want you to be able to use the beSocratic homework assignments to actively engage in building and using your knowledge of chemistry without worrying about being evaluated. Therefore, credit will be given for completion of these activities with your best effort rather than for the correctness of responses. Sometimes homework will cover content before it is discussed in class because we are interested in your pre-existing knowledge and we also want you to acknowledge your current ideas, both correct and incorrect. What you already know or think impacts your learning. Homework assignments will be discussed in class.

Detailed information on getting started with and using beSocratic is provided in a separate “beSocratic Tips and Tricks” document in D2L. In order to use beSocratic, you will need to install the latest version of Microsoft Silverlight (http://www.microsoft.com/silverlight/). Silverlight is NOT compatible with the Google Chrome or Microsoft Edge browsers. You will need to use either Firefox or Safari. You will complete an introductory activity in class before your first homework assignment to make sure that your computer is properly configured and that you can access your account in beSocratic. A link to each beSocratic homework activity will be provided in D2L. If you encounter technical issues with beSocratic, you should send email to gchem.besocratic@chemistry.msu.edu. Do NOT send email to your instructor or learning assistant; our access to beSocratic will not allow us to troubleshoot technical problems. Technical issues are not an acceptable excuse for failing to complete an assignment. If you cannot complete an assignment on your computer, you should use a computer in the library or a computer lab. No makeups or extensions will be offered for missed beSocratic assignments.

Links for questionnaires administered through the Qualtrics survey system will be sent to your MSU email account. It is important that you check your MSU email account regularly because this is the official channel that the University and your instructors will use to communicate with you. We would discourage you from forwarding your MSU email to another account because other mail servers may reject email forwarded from MSU accounts. Failure to look at your MSU email or loss of email in forwarding is not a valid excuse for missing homework assignments.

Toolbox/Quizzes

Over the course of the semester you will be developing a personal Chemistry Toolbox with our guidance that you can use in CEM 121 and CEM 141. The Toolbox is intended to help you
identify themes/big ideas in chemistry, organize your ideas about chemistry, and make connections between ideas in chemistry. Your toolbox may also include problem-solving strategies. Short quizzes will be given periodically in recitations to make sure students are up-to-date with new skills and information. Toolbox notebooks may be used during these quizzes and will be visually checked by the LA when quizzes are given. With each quiz grade there will be a toolbox grade, based on adequate completion of the toolbox notebook. Toolbox notebooks will be collected on the day of each test and at the final exam for review. We are interested in what each of you includes in your Toolbox as being important to helping you understand and use ideas in chemistry. Toolbox notebooks collected at the final exam will be returned at beginning of next semester so that you have them available while you are taking CEM 141. A composition book to use in creating your Chemistry Toolbox will be provided.

Why is it important to develop a Toolbox? Experts in scientific disciplines organize their knowledge around the big or central ideas in the discipline and the relationships between these big ideas. We want you to become more expert-like in your ability to use ideas and make connections between ideas in chemistry.

Academic Integrity

By enrolling as a student at Michigan State University, you have joined an academic community built on trust and mutual respect. As stated in Academic Freedom for Students at Michigan State University, “The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards.” As such, each time that you submit work for a grade you are attesting that this work is your work and that it has been prepared following the guidelines provided for the assignment. Further, if you observe an act of academic dishonesty, you are obligated to report it to the instructor. In any work that involves collaboration, you are expected to make a good-faith effort to contribute.


As a Spartan, I will strive to uphold values of the highest ethical standard. I will practice honesty in my work, foster honesty in my peers, and take pride in knowing that honor in ownership is worth more than grades. I will carry these values beyond my time as a student at Michigan State University, continuing the endeavor to build personal integrity in all that I do.

The Spartan Code of Honor has been endorsed by Academic Governance, the Provost, President, and Board of Trustees. You are encouraged to take the pledge

https://honorcode.msu.edu/take-the-pledge/

The Department of Chemistry adheres to MSU Policies, Regulations and Ordinances Regarding Academic Honesty and Integrity (https://www.msu.edu/~ombud/academic-integrity/index.html). In this course, any student who cheats by copying the work of others, using unauthorized materials, or communicating with others during a test or final exam will

2 Academic Freedom for Students at Michigan State University, Article 2: Academic Rights and Responsibilities (http://splife.studentlife.msu.edu/academic-freedom-for-students-at-michigan-state-university/article-2-academic-rights-and-responsibilities)
receive a penalty grade of 0. Students who submit in-class work for another student who is not present will receive no credit for their work on that day.

An Academic Dishonesty Report will be filed as required by MSU policy any time that a penalty grade is given. A student’s academic dean will receive this report, and it will be added to the student’s academic record. If a student feels that he/she has been unjustly accused of academic dishonesty, he/she should first meet with his/her instructor to resolve the dispute. If dissatisfied with the outcome of this meeting, the student can meet with the Chair of the Department of Chemistry. Finally, a student can contest an allegation of academic dishonesty and penalty grade by filing a grievance with the University Academic Integrity Hearing Board after meeting with his/her instructor and the Chemistry Department Chair.

**Attendance & Classroom Etiquette**

**Attendance**

In-class work is integral to this course. To encourage your attendance and participation in class, a portion of the semester grade is tied to in-class assignments. Attendance will be taken in each class period. You may miss a maximum of three classes without penalty. For every additional class missed, you will lose 5 points from your in-class work score. **If you are late in arriving for class, you will not receive full credit** because it is likely that you will not know what is going on and consequently will be unable to participate fully and contribute productively to your group.

Attendance is required at all recitations. You will receive credit for attendance and participation. You will not be able to make up missed work, unless you have made arrangements with your learning assistant or instructor prior to the missed recitation.

**Classroom Etiquette**

- Please arrive to class on time and prepared to work.
- Cell phones, tablets, and computers should be put away during class, unless instructed otherwise. Not only are they a distraction to the user, research has shown that the use of electronic devices negatively impacts the performance of other students who are seated near the user. (By the way, research has shown that “multitasking” diminishes effectiveness on all tasks.)
- Please turn your cell phone off during class; otherwise, Dr. Posey or Dr. Matz might have to answer your phone for you, which could be embarrassing.
- Please be courteous and respectful of the opinions and contributions of others.
- Participate in discussions with your group. The rest of your group wants to hear what you have to say.
- If you must arrive in class late or leave early, please show your classmates respect by doing this with minimum disruption.
- Please refrain from using headphones, earbuds, and cell phones during class.

**Media Derived from the Classroom**

As members of a learning community, students are expected to respect the intellectual property of course instructors. All course materials presented to students are the copyrighted property of the course instructor and are subject to the following conditions of use:
1. Students may record lectures or any other classroom activities and use the recordings only for their own course-related purposes.

2. Students may share the recordings with other students enrolled in the class. Sharing is limited to using the recordings only for their own course-related purposes.

3. Students may not post the recordings or other course materials online or distribute them to anyone not enrolled in the class without the advance written permission of the course instructor and, if applicable, any students whose voice or image is included in the recordings.

4. Any student violating the conditions described above may face academic disciplinary sanctions.

**Americans with Disabilities Act Accommodations**

Michigan State University is committed to providing equal opportunity for participation in all programs, services, and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities by phone at 517-884-RCPD or through the web at [https://www.rcpd.msu.edu](https://www.rcpd.msu.edu). Once your eligibility for an accommodation has been determined, you will be issued a verified individual services accommodation (“VISA”) form. Please present this form to your instructor at the start of the semester and/or at least two weeks prior to the accommodation date (test, final exam, homework, etc.). Requests received after this date will be honored whenever possible. Web-accessible course materials will be provided upon request.