Lecture: CHEM 111.01 (CRN 4322)
Recitation/Lab: CHEM 111.01A (CRN 4323) & CHEM 111.01B (CRN 4324)
Introductory Chemistry I
Fall 2021

Instructor: Maria V. Schiza, Ph.D.
Office: Caputo Hall 219
Office Phone #: 717-871-7437
e-mail: maria.schiza@millersville.edu (best way to be reached)

Meeting Times:
Lecture: M W F 11:00-11:50 am—Roddy 149
Recitation/Lab:
Section A: Wed. 2:00-2:50 pm/3:00-4:50 pm—Roddy 153/Caputo 328
Section B: Thu. 9:00-9:50 am/10:00-11:50 am—Roddy 153/Caputo 328

Office Hours:
Office Hours: in person-Caputo 219
Mon/Tue/Wed/Fri: 9:00-10:00 am & Thu: 1:00-2:00 pm
Alternative times can be scheduled by appointment or virtually through Zoom.

Welcome to CHEM 111:
I would like to welcome you all to CHEM 111 – Introductory Chemistry I! I am very excited to start this semester and meet and interact with you in-person. As you all know we are leaving in an unusual time and we should all try to do our best to protect our health and the health of others. Please follow the University guidelines regarding the pandemic and masking. If you have any symptoms related to the virus, please stay at home and notify your instructors as soon as possible. I will remain flexible and work with you to ensure optimal learning for successful completion of the course.

Required Course Materials:
- **Textbook**: is available in web view (recommended) and PDF for free online at the following webpage: [https://openstax.org/details/books/chemistry-2e](https://openstax.org/details/books/chemistry-2e)
  You can also choose to purchase it on iBooks or get a print version via the campus bookstore or from OpenStax on Amazon.com. You can use whichever formats you want. Chemistry, 2e from OpenStax, Print ISBN 194717262X, Digital ISBN 1947172611

- **Recitation/Laboratory Materials**: will be available on Desire to Learn/Brightspace (D2L)
- **Safety Glasses/Goggles for the laboratory**: can be purchased in the bookstore or Caputo 330
- **Laboratory Notebook**: can be purchased in the bookstore (bound/quadrille based)
- **Calculator**: Scientific calculator capable of performing logarithmic (log, In) and exponential (10^x, e^x, y^x) functions.
- **Regular access to D2L**: [https://millersville.desire2learn.com](https://millersville.desire2learn.com) and university email

Course Description and Learning Objectives:
CHEM111 is the first semester course of General Chemistry (followed by CHEM112) for students majoring in chemistry as well as biology, earth sciences and physics. Learning the material covered in CHEM111 provides students with a foundational understanding of scientific principles needed in future studies in any field of science. Students who successfully complete CHEM111 should have a fundamental understanding of chemical stoichiometry, atomic structure, ideal gas behavior, chemical energy, intermolecular forces, covalent and ionic bonding, and properties of liquids, solutions, and solids.

**Chapters 1 through 11 are covered in CHEM111.**
**Learning Outcomes:** Upon the completion of CHEM 111 students should have an understanding of:

1. properties of atoms, molecules, and the various states of matter
2. the atomic structure and the periodicity of elements in the periodic table
3. the idea of a mole and the use of chemical stoichiometry
4. precipitation reactions, acid/base reactions, and redox reactions
5. the “gas laws” governing the physical/chemical behavior of gases
6. chemical reactions that involve energy flow
7. simple quantum mechanical treatments of atoms and molecules
8. current bonding models for simple inorganic and organic molecules in order to predict structures and important bonding parameters
9. how to predict molecular geometries of selected molecular species
10. properties of solids, liquids and solutions and intermolecular forces

---

**Tentative Lecture Schedule - CHEM 111 – Fall 2021:**

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Module</th>
<th>Assessment/Comment</th>
</tr>
</thead>
</table>
| Essential Ideas - Chapter 1 | Module 1: Properties of Matter  
Module 2: Measurements | D2L assigned readings, D2L worksheet(s) with suggested practice problems  
**D2L Quizzes every other week**  
Exam 1 (the exam date will be announced a week in advance - material examined from modules 1-6) |
| Atoms, Molecules, and Ions – Chapter 2 | Module 3: Atomic Theory  
Module 4: Elements and Compounds |  |
| Composition of Substances and Solutions – Chapter 3 | Module 5: The Mole  
Module 6: Aqueous Solutions |  |
| Stoichiometry of Chemical Reactions – Chapter 4 | Module 7: Chemical Equations  
Module 8: Reaction Stoichiometry | D2L assigned readings, D2L worksheet(s) with suggested practice problems  
**D2L Quizzes every other week**  
Exam 2 (the exam date will be announced a week in advance - material examined from modules 7-14) |
| Gases – Chapter 9 | Module 9: Gas Laws  
Module 10: Gas Stoichiometry  
Module 11: The Kinetic-Molecular Theory |  |
| Thermochemistry – Chapter 5 | Module 12: Introduction to Energy  
Module 13: Calorimetry  
Module 14: Enthalpy |  |
Module 16: Quantum Theory  
Module 17: Periodic Properties | D2L assigned readings, D2L worksheet(s) with suggested practice problems  
**D2L Quizzes every other week** |
| Chemical Bonding and Molecular Geometry – Chapter 7 | Module 18: Ionic and Covalent Bonding  
Module 19: Lewis Structures | Exam 3 (the exam date will be announced a week in advance - material examined from modules 15-21) |
Module 20: Molecular Structure and Polarity

Advanced Theories of Covalent Bonding – Chapter 8

Module 21: Advanced Theories of Covalent Bonding

Liquids and Solids – Chapter 10

Module 22: Intermolecular Forces
Module 23: Phase Changes
Module 24: The Solid State of Matter

D2L assigned readings, D2L worksheet(s) with suggested practice problems

D2L Quizzes every other week

Solutions and Colloids - Chapter 11

Module 25: Solubility
Module 26: Colligative Properties

CUMMULATIVE FINAL EXAM – All modules covered

Friday, December 10th, 8-10 am

LECTURE:

D2L Quizzes: There will be seven (7) quizzes. Those will be based on previous covered material in lecture and assigned textbook practice problems/worksheets/handouts related to the lecture material. The quizzes will be given on Fridays through D2L, every other week. There will be no quiz the first week of classes or the last week of classes.

Exams: There will be three (3) exams and one (1) cumulative final. Those will be based on covered material in lecture as indicated by the modules. All exams will be given in person.

RECITATION:

Recitation sessions are dedicated to a) mastering the lecture material, b) problem solving. Practice problems will be assigned from the textbook and additional worksheets with extra practice problems will be posted in D2L. Such problems will be discussed and solved during recitation.

LAB:

Each experiment (9 experiments), performed in the laboratory, will be introduced in recitation/lab. The basic concepts and theory for the lab as well as any calculations or graphs needed for each experiment will be discussed during this time.

Lab Notebook: Each student must keep a laboratory notebook and record all experimental information during the lab period. Laboratory notebooks will be examined on a regular basis to assure the proper recording of experimental data and procedures. Carefully follow the instructions below:

How to Keep a Good Laboratory Notebook:

The laboratory notebook is used as a record of your work during an experiment in the laboratory. **All data, and observations should be recorded in ink.** If a mistake is made, do not use white out, tear out or insert pages. Instead cross the mistake out (single line) and make a note of the reason why this was a mistake. All pages should be numbered and dated (top right corner). If any pages are left blank, they should be crossed with an X. The title of each experiment should be recorded in the beginning, before any data is recorded. If you work with a partner, you should record your name as well as your partner’s name on the notebook. An outline of the experimental procedure should be in your notebook before coming to lab. All data should be recorded clearly and using the correct significant figures and units. **NEVER, record data in another sheet of paper and then transfer it to the notebook.** All calculations, graphs and tables should be recorded into the notebook.
Evaluation of the notebook will be based on the following criteria:

1) Top of each page: title, page#, date, name(s)
2) Purpose: describe what is measured or determined (1-2 sentences)
3) Brief outline of the procedure (bulleted or narrative format)
4) Data presentation in table format (include: significant figures, labels and units)
5) Results: sample calculations and quality of results (statistics)
6) Graphs: title, labels, units (Note: recording of the post lab questions or conclusion is not required!)
7) Format: organization, neatness, completeness

Lab Reports:
Once an experiment has been completed, a lab report must be submitted for grading. Templates for each experimental lab report will be available on D2L. The lab reports should be typed neatly with all required areas completed. Sample calculations can be typed. Calculations can also be hand-written. Any graphs associated with the lab need to be attached to the lab report as well. Lab reports should be printed and hand-in to the lab instructor. They will be due a week after the experiment is completed. Lab reports submitted late will receive 50% of the grade. If lab reports are not submitted at all, they will receive a grade of zero.

Lab Final: A timed lab final, which will be based on Experiment 6, will be performed in the laboratory at the end of the semester.

Tentative Laboratory Schedule:
Wednesday and Thursday Labs

<table>
<thead>
<tr>
<th>Date</th>
<th>Title – Experiment</th>
<th>Experiment #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 25, 26</td>
<td>Safety / Measurements and Density – Part II</td>
<td>Exp 1/Check-in</td>
</tr>
<tr>
<td>Sept 1, 2</td>
<td>Formula and Composition of a Hydrate – Part A</td>
<td>Exp 2 (2 Weeks)</td>
</tr>
<tr>
<td>Sept 8, 9</td>
<td>Formula and Composition of a Hydrate – Part B</td>
<td>Exp 2</td>
</tr>
<tr>
<td>Sept 15, 16</td>
<td>Identification of Common Chemicals</td>
<td>Exp 6 (2 Weeks)</td>
</tr>
<tr>
<td>Sept 22, 23</td>
<td>Identification of Common Chemicals</td>
<td>Exp 6</td>
</tr>
<tr>
<td>Sept 29, 30</td>
<td>Titration of Acids and Bases - Part B</td>
<td>Exp 7</td>
</tr>
<tr>
<td>Oct 6, 7</td>
<td>Gravimetric and Volumetric Analysis - Part A &amp; B</td>
<td>Exp 8 (2 Weeks)</td>
</tr>
<tr>
<td>Oct 13, 14</td>
<td>Gravimetric and Volumetric Analysis - Part C</td>
<td>Exp 8</td>
</tr>
<tr>
<td>Oct 20, 21</td>
<td>Evaluation of the Gas Law Constant</td>
<td>Exp 10</td>
</tr>
<tr>
<td>Oct 27, 28</td>
<td>Thermochemistry: Heat of Reactions</td>
<td>Exp 11</td>
</tr>
<tr>
<td>Nov 3, 4</td>
<td>Spectrophotometric Analysis of Aspirin – Part B</td>
<td>Exp 12 (2 Weeks)</td>
</tr>
<tr>
<td>Nov 10, 11</td>
<td>Spectrophotometric Analysis of Aspirin – Part C</td>
<td>Exp 12</td>
</tr>
<tr>
<td>Nov 17, 18</td>
<td>Lab Final - based on Experiment 6</td>
<td>Timed test/Check-out</td>
</tr>
<tr>
<td>Nov 24, 25</td>
<td>Thanksgiving Break – No Rec/Lab</td>
<td></td>
</tr>
<tr>
<td>Dec 1, 2</td>
<td>Molecular Models and Covalent Bonding / Theoretical Lab</td>
<td>Exp 13</td>
</tr>
</tbody>
</table>

COURSE POLICIES:

Class and Recitation Attendance:
Students are expected to attend all lectures and recitations. Students are responsible for all material covered. It is the responsibility of the student to master the material covered. If you need to be excused for a valid reason, please notify me in advance in order to arrange the make-up of any missed work. In unexpected cases (illness, death in the family), contact me as soon as possible by e-mail or phone within
the week of the absence. Any make-up quiz or exam conducted outside the schedule may differ in form or exact content from the regularly scheduled quiz or exam. Making up missed work is at the discretion of the instructor, as long as proper and validated excuse is presented. A grade of 60% is required in lecture and recitation to pass the course.

Laboratory Attendance:
Students must attend lab every week. Students need to complete all laboratories assignments/lab reports. A grade of 60% in lab is required to pass the course. Making up missed lab work is at the discretion of the instructor. A make-up lab should be completed within a week of the missed laboratory.

Academic Honesty:
Students are expected to conduct all CHEM111 work in an honest and ethical manner. Cheating on coursework bypasses the learning process and will NOT be tolerated. Anyone caught cheating will be assigned a score of zero on the work. ALL work is individual. Habitual academic dishonesty will be penalized to the maximum.

Cooperative Environment:
Students with any special concerns about CHEM111 are welcome to approach me about them. Together, we can address each particular situation. Resources available include the Office of Learning Services and Tutoring Center (Lyle Hall).

<table>
<thead>
<tr>
<th>Grading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture:</td>
</tr>
<tr>
<td>Quizzes (15 points each)</td>
</tr>
<tr>
<td>Exams (100 points each)</td>
</tr>
<tr>
<td>Final (195 points)</td>
</tr>
<tr>
<td>Lecture subtotal</td>
</tr>
<tr>
<td>Lab:</td>
</tr>
<tr>
<td>Lab Notebook (25 points)</td>
</tr>
<tr>
<td>Lab Reports (15 points each)</td>
</tr>
<tr>
<td>Lab Final (40 points)</td>
</tr>
<tr>
<td>Lab subtotal</td>
</tr>
<tr>
<td>Total for the class</td>
</tr>
</tbody>
</table>

*Note*
A grade of 60% is required in lab to pass the course. A grade of 60% is required in lecture and recitation to pass the course.

*Note*
Class participation will be taken into consideration during final grading.

*Note*
To pass CHEM 111, you must have a passing grade in the lecture/recitation component (at least D-). Grade of C- or better is required to enroll in CHEM 112. (Grade of C or better is required to enroll in CHEM 112 for chemistry majors).
<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>92-100</td>
</tr>
<tr>
<td>A-</td>
<td>90-91.9</td>
</tr>
<tr>
<td>B+</td>
<td>88-89.9</td>
</tr>
<tr>
<td>B</td>
<td>82-87.9</td>
</tr>
<tr>
<td>B-</td>
<td>80-81.9</td>
</tr>
<tr>
<td>C+</td>
<td>78-79.9</td>
</tr>
<tr>
<td>C</td>
<td>72-77.9</td>
</tr>
<tr>
<td>C-</td>
<td>70-71.9</td>
</tr>
<tr>
<td>D+</td>
<td>68-69.9</td>
</tr>
<tr>
<td>D</td>
<td>62-67.9</td>
</tr>
<tr>
<td>D-</td>
<td>60-61.9</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60</td>
</tr>
</tbody>
</table>

**Available Tutoring:**
The tutoring options for the Fall 2021 semester are as follows:

1. **Chemistry Peer Learning Hours - available In-Person:**
   - **Tuesdays and Thursdays** - Roddy 153 from 2 – 4 and 5 – 7 pm
   - **Wednesdays** - Caputo 212 from 2 – 4 pm
   - Roddy 153 from 5 – 7 pm
   You can attend any of these sessions at any time with no need to sign-up. Please think of these hours as a place to work on your chemistry where support is available and not just wait until you fall behind in a course.

2. **Individual and Small-Group tutoring could also be available.** You will be encouraged to try Peer Learning Hours first to see if it meets your needs and will be assigned individual or small group tutors if Peer Learning Hours does not meet your needs. This tutoring could be in-person or virtual. Please contact Dr. Dan Albert for further information: Daniel.albert@millersville.edu

3. **The University also has Smarthinking available for 24/7 online tutoring support** for 100-level chemistry courses and organic chemistry.
   - [https://wiki.millersville.edu/display/instructdocs/Smarthinking+Online+Tutoring](https://wiki.millersville.edu/display/instructdocs/Smarthinking+Online+Tutoring)

4. To access Smarthinking, go to the D2L University menu and select Smarthinking.

**Title IX Statement**

Millersville University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment, comply with Title IX of the Education Amendments of 1972, 20 U.S.C. §1681, et seq., and act in accordance with guidance from the Office for Civil Rights, the University requires faculty members to report to the University’s Title IX Coordinator incidents of sexual violence shared by students. The only exceptions to the faculty member’s reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report to the person designated in the University Protection of Minors policy incidents of sexual violence or any abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred. Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is available at [www.millersville.edu/titleix](http://www.millersville.edu/titleix).