

Syllabus

Chemistry 103

Spring 2018

Class Meetings: MWF: time TBD Fulmer 226

Instructor: Dr. Paul Buckley Fulmer 120 335-8282 ptbuckley@wsu.edu
Office Hours: Tuesday 10 am, Thursday 1 pm, or by appointment

General Chemistry Office:

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Course Website: Blackboard Learn (Bb) <https://learn.wsu.edu>

Grading:	2 exams (midterm, final)	200	Grade Ranges (minimum percent)		
	14 Online Homework Sets (best 12)	240	90 A	87 A-	
	~39 Reading Assignments (best 35)	105	84 B+	80 B	77 B-
	~39 Learning Catalytics Sets (best 35)	350	74 C+	70 C	67 C-
	Concept Maps (6 maps)	<u>105</u>	64 D+	60 D	< 60 F
	TOTAL	1000			

Midterm Exam: Friday, March 2, in class.

Final Exam Thursday, May 3; 1:00 pm – 3:00 pm

Assessment Criteria:

- **Exams-** Exams will be a combination of multiple choice, and open-ended (show your work) type of problems. Open-ended problems will provide the opportunity to earn partial credit based upon your problem-solving approach to the question.
- **On-line Homework Sets-** The points awarded for these questions will be based on the correctness of your answer, but you will be given an unlimited number of attempts to answer the questions.
- **Reading Assignments-** Reading Assignments will be done on-line using the same platform as the Homework Sets. The points awarded for these questions will be based on the correctness of your answer, but you will be given an unlimited number of attempts to answer the questions.
- **Learning Catalytics-** These are in-class, bring your own device, question and response exercises designed to test your understanding of the current course concepts. These sessions will be the vehicle through which in-class, group-based problem solving will occur. Each session is worth 10 points. Participation and answering questions will comprise 60% of the points for each session, and correctness of your answer will count for the remaining 40%.
- **Concept Maps-** These are graphical representations of the interconnectedness of chemistry concepts. You will be shown how to construct these maps in class. Most maps will be constructed outside of class, but we will do the first two in class in groups.

Prerequisites for this class are: Concurrent enrollment in CHEM 104; MATH 103, or placement into MATH 105, a minimum ALEKS math placement score of 45%, or concurrent enrollment in or credit for MATH 105, 106, 107, 108, 140, 171, 172, 182, 201, 202, ENGR 107, STAT 205 or 212.

Text: *Chemistry: A Molecular Approach* by Tro, 4th edition, Pearson (2017).
First Day- electronic access to all Pearson course materials.

Course Objectives, Learning Goals, and Expected Outcomes: Chemistry 103 is designed to advance students toward the WSU Learning Goals, especially Scientific Literacy, Critical and Creative Thinking, Quantitative Reasoning, and Information Literacy. In particular, students who successfully complete Chemistry 103 will be able to:

- 1) Apply knowledge in four unifying chemistry concept areas to a wide range of contextual frameworks in chemistry.
- 2) Make connections between concept areas in different contextual frameworks in chemistry.
- 3) Explain conceptual connections through classifying, describing, and discussing information.
- 4) Become confident and prepared for Chemistry 105.

Flipped Class Format: Chem 103 will follow the “flipped classroom” model. In traditional “lecture” classes, students listen to an instructor introduce a topic, and then attempt more advanced, higher level problem solving exercises later on outside of class. In a flipped classroom, students are introduced to the basic elements of a topic outside of class, typically through a reading assignment or watching a short video. The next class meeting is devoted to higher order processing, problem solving, and analysis of course topics while the instructor and TAs are there to help. Classroom activities will mostly involve group work on assigned tasks, and “bring your own device” assessments of student learning. Lecturing will be kept to a bare minimum.

Curricular Design: This class takes a non-traditional approach to the chapters in a general chemistry textbook. Rather than go through each chapter one at a time, we will pass through all ten chapters four times, each time through a lens of a different unifying concept. The goal is to strengthen conceptual understanding of general chemistry, and to emphasize the connections between chapters. A framework for this curriculum is found on the last page of this syllabus.

Online Components: There are several aspects of the course, described below, that are accessed through the Blackboard Learn online course management system (<https://learn.wsu.edu>). Mastering Chemistry and Learning Catalytics are accessed through the Mastering Chemistry link on Blackboard. You will need an access code to establish your account. Mastering Chemistry access codes are bundled with new copies of the textbook and sold separately in the bookstores. You may also purchase a Mastering Chemistry registration code or a 14-day free trial, through the Pearson website when you initially register. This initial registration is only through the Bb course website. Detailed instructions for accessing the Mastering system and Learning Catalytics the first time are given at the end of the syllabus. (Required)

Calculators: You are expected to have and to be able to use a scientific calculator. Graphing calculators are allowed but not required. The use of any stored information/programs in a programmable calculator, such as the TI N-spire will be considered cheating. Calculators with a full keyboard (such as the TI-92 or Voyage 200); PDAs; palmtop, laptop and handheld computers; and cell phone/calculator combinations may not be used during examinations. You are responsible for bringing your calculator to all class meetings and exams.

Classroom Devices: In order to participate in the in-class questions using Learning Catalytics (part of the Mastering Chemistry package) students must bring to lecture a device that is Wi-Fi enabled and log in to their Mastering Chemistry account in the lecture room. This can be a cell phone, tablet, or laptop.

Course Website: We will be using the Bb course management system for the course website. This can be accessed via <https://learn.wsu.edu>. You are responsible for checking this site regularly. Use your WSU network ID and password to log in. You can also send email to the course instructor, TAs, or other students via the Bb Course Email tool.

Questions About Electronic Resources: When encountering difficulties with either Mastering Chemistry or Learning Catalytics, you are encouraged to use the built-in Help & Support system. If you would rather not communicate electronically, you can call Pearson’s WSU Priority phone number at (855) 875-1797 or the General Student Help phone number at (800) 677-6337 24-hours a day. The Discussion Forums and Facebook Community are also resources.

Reading Assignments: There will be reading assignments due at 6:00AM before each class meeting. These reading assignments are available through the Mastering Chemistry website. The assignments for the week are available from 4:00PM on the previous Friday. They are not a replacement for the reading, but do help you check on your understanding of selected concepts and methods from each text section, and help prepare you for the upcoming lecture. Each reading assignment is worth 3 points, and your score is determined by the fraction correct multiplied by the 3 points possible. The best 35 assignments will be counted toward your grade. It is important to note that the completion of these assignments is independent of lecture attendance. If you are sick or out of town, it is still possible to complete the assignments.

Learning Catalytics: There will be a Learning Catalytics session for each class meeting. These sessions are interactive and require a Wi-fi-enabled device, such as a smartphone, laptop, or tablet. You will log in to each session through Bb and then the Mastering Chemistry link, and answer questions posed to you by the instructor throughout the lecture period. This system also allows you to submit questions to the instructor or indicate you do not understand the material, giving real-time feedback to your instructor. Each Learning Catalytics session is worth 6 points. The best 35 assignments will be counted toward your grade. Each assignment is graded on both participation (75%) and correctness (25%). The assignment grade is the assignment fraction multiplied by the 6 points possible.

Homework: There will be weekly homework assignments administered through the Mastering Chemistry website accessed through Bb.

A new homework assignment will be made available each week (no later than 6:00AM each Tuesday). Each assignment must be completed by 6:00AM the following Tuesday. The due date/time for each assignment will be listed with the assignment on the homework site. Each homework set will be pro-rated to have a value of 20 course points, by taking the fraction correct and multiplying it by the 20 points possible.

You are encouraged to use the available Hints. *You will neither gain nor lose points for the use of the Hints.*

The best 12 assignments will count toward your grade. No credit is given for homework questions completed after the due date.

Expectations for Student Effort

As per WSU academic regulation 27, "Academic credit is a measure of the total minimum time commitment required of a typical student in a specific course. For the WSU semester system one semester credit is assigned for a minimum of 45 hours.... Achievement of course goals may require more than the minimum time commitment." This guideline includes time spent in class.

This guideline essentially states that a student can be reasonably expected to spend two hours outside of class on assignments for every one hour spent in class, or six hours per week outside of class for a three-credit course such as this. This is approximately the amount of time you should expect to spend on viewing pre-class videos, reading the textbook, and doing assigned problem solving exercises.

Policy on Late Assignments

Late assignments are not accepted. It is your responsibility to pay attention to due dates and make sure assignments are completed on time. Rather than accepting late assignments for reduced credit, most assignment categories (homework, reading assignments, learning catalytics) have between 2 – 4 "dropped" assignments, where your lowest scores for those assignment categories are not counted. Missed or late assignments will be counted as one of your "drops" in those categories.

Attendance Policy

It is expected that on-campus students attend every class meeting, and that online students participate in three discussion forums per week. Attendance will not be taken in class, but the use of Learning Catalytics is effectively a check on attendance. Missing class will result in missing a Learning Catalytics assignment, and be counted towards your "dropped" assignments in that assignment category.

Weekly Schedule (Subject to Modification) Chemistry 103

Week	Date	Chapters	Topic	Assessments	Notes
1	Jan. 8-12	1, 2, 3	Quantitative Relationships in Chapter 1 - 3		
2	Jan. 15-19	4	Quantitative Relationships in Chapter 4	HW 1	MLK Holiday 1/15
3	Jan. 22 - 26	5, 6, 7	Quantitative Relationships in Chapter 5-7	HW 2 Concept Map 1	
4	Jan. 29 - 2/2	8, 9, 10	Quantitative Relationships in Chapter 8 - 10	HW 3	
5	Feb. 5 - 9	1, 2, 3	Atomic and Molecular Structure, Chapter 1-3	HW 4 Concept Map 2	
6	Feb. 12 - 16	4, 5, 6	Atomic and Molecular Structure, Chapter 4-6	HW 5	
7	Feb. 19 - 23	7, 8	Atomic and Molecular Structure, Chapter 7, 8	HW 6 Concept Map 3	Pres. Day Holiday 2/19
8	Feb. 26 - Mar. 2	9, 10	Atomic and Molecular Structure, Chap. 9,10	HW 7 Midterm Exam	Midterm Exam Mar. 2
9	Mar. 5 - 9	1, 2, 3	Energy Changes, Chapter 1 - 3	HW 8	
	Mar. 12-16		Spring Break		
10	Mar. 19 - 23	4, 5, 6	Energy Changes, Chapter 4 - 6	HW 9 Concept Map 4	
11	Mar. 26 - 30	7, 8, 9	Energy Changes, Chapter 7 - 9	HW 10	
12	Apr. 2 - 6	10, 1, 2	Energy Changes, Chapter 1 Chemical Reactivity, Chapter 1 - 2	HW 11 Concept Map 5	
13	Apr. 9 - 13	3, 4, 5	Chemical Reactivity, Chapter 3 - 5	HW 12	
14	Apr. 16 - 20	6, 7, 8	Chemical Reactivity, Chapter 6 - 8	HW 13 Concept Map 6	
15	Apr. 23 - 27	9, 10	Chemical Reactivity, Chapter 9 - 10, Review, Catch up.	HW 14	
			Final Exam Week		Final Exam

Please see the "Curricular Design" page in this syllabus for an expanded list of learning outcomes for each unifying concept, by chapter.

Map of Course Learning Outcomes and their Link to Assessments

Student Learning Outcomes- At the end of the course, students should be able to:	Course Topics/Dates- The following topics/dates will address this outcome:	Evaluation of Outcome- This outcome will be evaluated primarily by:
Apply knowledge in four unifying chemistry concept areas to a wide range of contextual frameworks in chemistry.	Concept 1: Quantitative Relationships- Jan. 8 – Feb. 5 Concept 2: Energy Changes- Feb. 7 – Mar. 2 Concept 3: Atomic and Molecular Structure- Mar. 5 – Mar. 30 Concept 4: Chemical Reactivity- Apr. 2 – Apr. 27	Reading Assignments Homework assignments Midterm and Final Exams
Make connections between concept areas in different contextual frameworks in chemistry.	Concept 1: Quantitative Relationships- Jan. 8 – Feb. 5 Concept 2: Energy Changes- Feb. 7 – Mar. 2 Concept 3: Atomic and Molecular Structure- Mar. 5 – Mar. 30 Concept 4: Chemical Reactivity- Apr. 2 – Apr. 27	Concept maps Learning Catalytics assignments Homework assignments Midterm and Final Exams
Explain conceptual connections through classifying, describing, and discussing information.	Concept 1: Quantitative Relationships- Jan. 8 – Feb. 5 Concept 2: Energy Changes- Feb. 7 – Mar. 2 Concept 3: Atomic and Molecular Structure- Mar. 5 – Mar. 30 Concept 4: Chemical Reactivity- Apr. 2 – Apr. 27	Concept maps Learning Catalytics assignments Midterm and Final Exams
Become confident and prepared for Chemistry 105.	Concept 1: Quantitative Relationships- Jan. 8 – Feb. 5 Concept 2: Energy Changes- Feb. 7 – Mar. 2 Concept 3: Atomic and Molecular Structure- Mar. 5 – Mar. 30 Concept 4: Chemical Reactivity- Apr. 2 – Apr. 27	Homework assignments Reading assignments Concept maps Learning Catalytics assignments Midterm and Final Exams

Classroom Safety Statement

Classroom and campus safety are of paramount importance at Washington State University, and are the shared responsibility of the entire campus population. WSU urges students to follow the “Alert, Assess, Act” protocol for all types of emergencies and the “Run, Hide, Flight” response for an active shooter incident. Remain ALERT (through direct observation or emergency notification, ASSESS your specific situation, and ACT in the most appropriate way to assure your own safety (and the safety of others if you are able).

Please sign up for emergency alerts on your account at MyWSU. For more information on this subject, campus safety, and related topics, please view the FBI’s Run, Hide, Fight video and visit the WSU safety portal.

Academic Integrity: Cheating or plagiarism in any form will not be tolerated. Cheating includes, but is not limited to: copying work **OR** allowing your work to be copied; use of unauthorized material at quizzes and exams, any communication between students during a quiz or exam, and actively looking at another student’s paper during a quiz or exam. Use of any electronic device other than an approved calculator during a quiz or examination is cheating. The first incidence of cheating will result in a score of zero for that assignment, quiz or exam. A second incident of cheating will result in an F (without the option to withdraw) for the course and possible dismissal from the University.

Note that all instances of cheating will be reported to Academic Integrity, regardless of whether they result in an F for the class.

Accommodations: Reasonable accommodations are available for students who have a documented disability. If you need accommodations to fully participate in this class, please visit the Access Center. All accommodations **MUST** be approved through the Access Center (Washington Bldg, Room 217). Please stop by or call 509-335-3417 to make an appointment with an Access Advisor. Further information is available at <http://accesscenter.wsu.edu>.

Curricular Design

Each box in the grid below represents a connection between a unifying concept and a contextual framework. We will examine each chapter through the perspective of quantitative relationships, then re-examine each chapter through the perspective of energy, etc...until we have passed through each book chapter four times.

	Ch 1	Ch 2	Ch 3	Ch 4	Ch 5	Ch 6	Ch 7	Ch 8	Ch 9	Ch 10
	Matter and Measurement	Atoms and Elements	Molecules, Compounds, Equations	Stoichiometry and Reactions	Gases	Thermo	Quantum	Periodic Properties	Lewis Model, EN, Bond Polarity	Shapes, Valence Bond, MO
Quantitative Relationships	Unit Conversions, Problem Solving	Atomic Mass, Moles	Balance Cations and Anions, Moles of atoms in compounds	Basic Stoichiometry, Limiting Reactants	Gas Laws	Stoichiometry of Rxn Enthalpy	EMR, wavelength, frequency	Periodic Trends: Atomic and Ionic Radii	Number of bond types, in molecules and in moles	Conservation of orbitals
Energy	KE of phases, Temp scales, Problem solving w energy	Attractions/repulsions	Ionic v. Covalent Bonding, Effect of Bonding on Potential Energy	Electrolytes	Gas Pressure, partial Pressure	Enthalpy, Exo v. Endothermic rxns	Photon Energy Atomic Spec/ Bohr Model	Ionization Energy Orbitals and Energies	Lattice Energy Bond Energies	Delocalization/ Resonance
Atomic, Molecular Structure	Structure of Phases Classify Matter	Atomic Structure Isotopes	Naming Ionic and Molecular Compounds	Solute/Solvent Interactions	Kinetic Molecular Theory	Predict ΔH from Bond Energy	Atomic Orbitals	Electron Configs Relation to Periodic Table	Lewis Structures Bond Polarity, EN	VSEPR
Reactivity	Physical vs. Chemical Change	Conservation of Mass/ Periodic Reactivity	Balance Equations- Explore rxns in those equations	Pptn rxns Acid-Base Redox	Gas Phase Stoichiometry	Hess's Law	Photolytic Rxns	Periodic Chemical Behavior	Rxns based on Lewis Structure (e ⁻ tracking)	Reactivity in terms of shape and polarity