

# Syllabus

# Chemistry 105

# Spring 2018

**Class Meetings:** MWF: 11:10am or 2:10pm Fulmer 226

**Instructor:** Dr. Krista Nishida Fulmer 317A 335-9435 [krista\\_nishida@wsu.edu](mailto:krista_nishida@wsu.edu)  
Office Hours: 1-2pm Tuesdays and Thursdays, 3-4pm Wednesdays, or by appointment

**General Chemistry Coordinator:**

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**General Chemistry Lab Supervisor:**

Ryan Rice Fulmer 309 335-6358 [rwrice@wsu.edu](mailto:rwrice@wsu.edu)

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

<b>GRADING:</b>	3 "Midterm" Exams	300	<b>GRADE RANGES:</b> (minimum points to achieve)		
	Final Exam	150	900 points	A	730 points C+
	Homework Sets	90	870 points	A-	700 points C
	Reading Assignments	90	830 points	B+	670 points C-
	Learning Catalytics Sets	90	800 points	B	630 points D+
	Concept Mapping Activities	50	770 points	B-	600 points D
	Tutorial Participation	30			Less than 600 points: F
	8 Laboratory Experiments	<u>200</u>			
	<b>TOTAL</b>	<b>1000</b>			

<b>Midterm Exam:</b>	Thursday	February 1 <sup>st</sup>	6:00-7:30pm
	Thursday	March 1 <sup>st</sup>	6:00-7:30pm
	Thursday	April 12 <sup>th</sup>	6:00-7:30pm
<b>Final Exam</b>	Wednesday	May 2 <sup>nd</sup>	7:00-8:50pm

**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 75% of the points for each session, and correctness of your answer will count for the remaining 25%.
- **Concept Maps**- These are graphical representations of the interconnectedness of chemistry concepts. You will be shown how to construct these maps in class.

**Prerequisites** for this class are:

1. Enrollment in Math 106, or placement beyond Math 106. Students in Math 105 or lower cannot be enrolled for Chem 105. Credit for, or placement into, Math 140, Math 171, Math 172, or Math 202 meets this prerequisite.
2. One year of High School chemistry, credit for Chem 101, or one quarter of Chemistry from a community college.

**Text:** *Chemistry: A Molecular Approach* by Tro, 4<sup>th</sup> edition, Pearson (2017).

**Course Objectives, Learning Goals, and Expected Outcomes:** Chemistry 105 fulfills three credits of Inquiry in the Physical Sciences [PSCI] and one credit of laboratory as part of the WSU Common Course Requirements (UCORE). As with all UCORE courses, Chemistry 105 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 105 will be able to:

1. Develop an understanding of the concepts, models, and theories that form a foundation for the field of chemistry (the understanding of how the behavior of matter is determined by the properties of atoms and molecules).
2. Remember the basic vocabulary of chemistry, the metric prefixes and the names of the most common elements.
3. Apply standard algorithmic calculation procedures, individually and in combination, that relate macroscopic properties, including mass, volume, pressure, and temperature of substances. Be able to balance chemical reactions and relate amounts of reactants and products as well as associated energy changes. In addition, be able to relate macroscopic and atomic level properties of numbers of atoms and molecules, chemical formulas, and molecular structures.
4. Apply models of bonding to predict and describe the structure of molecules including their physical properties.
5. Create procedures to solve problems by applying single and multiple concepts to new situations.
6. Apply chemical procedures and evaluate experimental results to develop an appreciation for the experimental basis of chemical knowledge and experimental methods through laboratory work.
7. Write effectively about scientific experiments by describing laboratory procedures and results, and then evaluating and presenting a discussion of these results in the manner of a scientific report.

**Flipped Class Format:** Chem 105 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 minimum.

**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 to opt in to WSU's *First Day* to purchase and establish your account. 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)

### ***First Day***

*First Day* is a pilot program focusing on reducing student costs for course materials. It includes the ability to charge the cost of the required online components of the course to the student's account, thereby giving the student full access to these components on the first day of instruction.

If a student “opts out” of *First Day*, they **will not** have access to the required homework and in-class systems. Access to Mastering Chemistry and Learning Catalytics for this course **CANNOT** be purchased from any other source. For more information, see <https://chem.wsu.edu/firstday/>.

**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 7:00AM before each class meeting. These reading assignments are available through the Mastering Chemistry website. 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. There will be more than 100 Reading Assignment points, 90 of which 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 3 points. There will be more than 100 Learning Catalytics points, 90 of which 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 3 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 7:00AM each Tuesday). Each assignment must be completed by 7:00AM 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 10 course points, by taking the fraction correct and multiplying it by the 10 points possible.

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

There will be more than 100 Homework points, 90 of which will count toward your grade. No credit is given for homework questions completed after the due date.

**LABORATORIES:** Your course section includes a lecture time and a laboratory time. This is a laboratory UCORE course, and the laboratory must be completed in order to pass the course. There will be 11 laboratory experiments and reports, 8 of which will count toward your grade. You must receive 8 non-zero lab scores in order to pass the class. A 4<sup>th</sup> zero in lab will result in an automatic failure of the course, resulting in an F. **No late lab reports will be accepted.**

**Make-up labs:** There are **NO** make-up labs in this course. If you miss a lab for any reason, it will count as one of your 3 drops.

**Pre-laboratory assignments:** Pre-laboratory assignments are found online on the course Blackboard page and are due Tuesdays at 7:00am the week you are performing that experiment. Students who fail to submit a complete pre-lab assignment at this time will receive a zero on the pre-lab **AND** be required to

complete the pre-lab assignment before they are admitted to lab. A pre-lab verification slip must be obtained from the general chemistry office prior to being admitted to lab. The student will not be given extra time in the laboratory to make up for laboratory time spent completing the pre-lab.

**Laboratory procedure:** Students are to perform the experiments individually unless the laboratory manual specifically requires partners for the experiment being performed. Each student is expected to record all data and observations for each experiment directly into their own laboratory notebook. Data may not be recorded on loose, 'scratch' paper then transferred to the notebook. Submission of identical data by two or more students who are not assigned to be laboratory partners will be considered cheating. Appropriate penalties will be applied to all parties. Some experiments will require you to transfer data from your notebook into a laboratory computer before you leave lab. The data and any computer-generated data must be written in the notebook! You are required to get your TA's signature on your data/observations at the end of the experiment. You will then submit the original copy of the data to your TA before you leave lab.

**Laboratory dress code:** For your safety, a strict dress code will be enforced in the laboratory. Failure to comply with the dress code will result in expulsion from the laboratory and a consequent score of zero for that experiment. The dress code requires that you be fully clothed from shoulder to toe. No shorts, short skirts, or shoes that do not cover the entire foot are permitted. It is required that you wear a full-length lab coat. This will adequately cover the upper body, but your legs, ankles and feet must be covered by your 'street clothing'.

**Laboratory reports:** Each experiment will have a post-lab report, due at 11:59PM Wednesday, one week following the completion of that experiment. The specific instructions for these reports will be posted within Blackboard. Post-laboratory reports (including calculations) must be submitted online through the course Blackboard site. Failure to submit a post-lab for an experiment will result in zero credit for that experiment (no credit will be given for the pre-lab or data and observations sections in the absence of a submitted post-lab.)

It is your responsibility to complete **AND** submit the correct assignment before the due date. If you upload an incorrect document or are having technical difficulties, you must allow for reasonable time for your instructor or TA to respond or reset your assignment. Sending your instructor or TA an email before the due date without reasonable time for a response will result in a zero on the assignment, no matter the circumstance. You are encouraged to complete your assignments **early** in order to allow for any unexpected situations.

**Adjustments to laboratory scores:** The instructor will make every effort ensure that the grading of laboratory reports is consistent and fair. To this end, the instructors reserve the right to normalize the laboratory scores from the different laboratory instructors to the same average. Any such adjustment will be made at the end of the semester after all scores have been submitted. TA performance will be assessed throughout the semester with the goal of eliminating any necessity for these adjustments. Students are encouraged to bring any concerns about the equity of the grading process to the attention of the course instructor.

### **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 more assignment points than what are counted toward your grade, which means you can miss assignments or make mistakes on them without significant grade penalty, so long as you still meet the maximum points that count toward your grade.

### **Attendance Policy**

It is expected that students attend every class meeting. 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” points in that assignment category.

### **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>.

## Map of Course Learning Outcomes and their Link to Assessments

<b>Student Learning Outcomes-</b>	<b>Course Topics/Dates-</b>	<b>Evaluation of Outcome-</b>
At the end of the course, students should be able to:	The dates will address this outcome:	This outcome will be evaluated primarily by:
Develop an understanding of the concepts, models, and theories that form a foundation for the field of chemistry.	Throughout the semester.	Concept Maps Reading Assignments Homework Assignments Midterm and Final Exams
Remember the basic vocabulary of chemistry, the metric prefixes and the names of the most common elements.	January 9-February 2	Reading Assignments Learning Catalytics Assignments Homework Assignments Midterm and Final Exams
Apply standard algorithmic calculation procedures that relate macroscopic properties of substances. Be able to balance chemical reactions and relate amounts of reactants and products as well as associated energy changes. Be able to relate macroscopic and atomic level properties.	January 8-March 30	Concept Maps Reading Assignments Learning Catalytics Assignments Homework Assignments Midterm and Final Exams
Apply models of bonding to predict and describe the structure of molecules including their physical properties	April 9-27	Homework Assignments Reading Assignments Learning Catalytics Assignments Midterm and Final Exams
Create procedures to solve problems by applying single and multiple concepts to new situations	Throughout the semester.	Homework Assignments
Apply chemical procedures and evaluate experimental results to develop an appreciation for the experimental basis of chemical knowledge and experimental methods through laboratory work	Throughout the semester in Lab.	Laboratory Assignments/Reports
Write effectively about scientific experiments by describing laboratory procedures and results, and then evaluating and presenting a discussion of these results in the manner of a scientific report	Throughout the semester in Lab.	Laboratory Assignments/Reports

# SCHEDULE

# CHEMISTRY 105

Spring 2018

	Date	Chapter	Topic	Lab Experiment / Topic	Lab report due	Concept Mapping	Exam	
1	Jan 8-12	1	Matter, Measurement, and Problem Solving	<i>Introduction to Excel</i>	<i>Intro to Excel</i>			
2*	Jan 15-19	1, 2	Atoms and Elements	<i>Laboratory Techniques and Measurements</i>		Friday, 1/19 during lecture		
3	Jan 22-26	2, 3	Molecules, Compounds, and Chemical Reactions	Worksheet: <i>Inorganic Nomenclature</i>	<i>Lab Techniques and Worksheet</i>			
4	Jan 29-Feb 2	3, 4	Molecules, Compounds, Equations, and Chemical Quantities	Tutorial only – no lab			<b>Exam 1</b>	
5	Feb 5-9	4	Chemical Quantities	<i>Limiting Reactants</i>		Friday, 2/9 during lecture		
6	Feb 12-16	4, 5	Aqueous Reactions, Gases	<i>Aqueous Solubilities of Ionic Compounds</i>	<i>Limiting Reactants</i>			
7 <sup>#</sup>	Feb 19-23	5	Gases continued	<i>Density of Air</i>	<i>Aqueous Solubilities</i>	Friday, 2/23 during lecture		
8	Feb 26-Mar 2	6	Thermochemistry	Tutorial only – no lab	<i>Density of Air</i>		<b>Exam 2</b>	
9	Mar 5-9	6, 7	Thermochemistry, Quantum Model of the Atom	<i>Analysis of Iron by Redox Titration</i>				
	Mar 12-16	<i>Spring Break</i>						
10	Mar 19-23	7	The Quantum Mechanical Model of the Atom	<i>Molar mass of a known and unknown acid</i>	<i>Iron Redox Titration</i>	Friday, 3/23 during lecture		
11	Mar 26-30	7, 8	The Quantum Mechanical Model of the Atom continued, Periodic Properties of the Elements	<i>Enthalpy of Formation of Ammonium Chloride</i>	<i>Molar Mass</i>			
12	Apr 2-6	8	Periodic Properties of the Elements continued	<i>Preparation of an Iron Oxalate Complex</i>	<i>Enthalpy of Formation</i>	Friday, 4/6 during lecture		
13	Apr 9-13	9	Chemical Bonding I: The Lewis Model	Tutorial only – no lab			<b>Exam 3</b>	
14	Apr 16-20	9, 10	Chemical Bonding I: The Lewis Model continued, Chemical Bonding II: Molecular Shapes, etc.	<i>The shapes of molecules and Ions</i>	<i>Iron Oxalate Complex</i>			
15	Apr 23-27	10	Chemical Bonding II: Molecular Shapes, etc. continued	Tutorial only: Final Exam Practice	<i>Shapes of Molecules</i>			
16	May 2	ALL	FINAL EXAM: <i>Wednesday, May 2<sup>nd</sup>, 7:00-8:50pm</i>					<b>Final</b>

\*Monday Holiday: No lecture on January 15<sup>th</sup>.

<sup>#</sup>Monday Holiday: No lecture on February 19<sup>th</sup>.

**SCHEDULE****CHEMISTRY 105****Spring 2018**

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1	Jan 8-12	1	Matter, Measurement, and Problem Solving	<i>Introduction to Excel</i>	<i>Intro to Excel</i>			
2*	Jan 15-19	1, 2	Atoms and Elements	<i>Laboratory Techniques and Measurements</i>		Friday, 1/19 during lecture		
3	Jan 22-26	2, 3	Molecules, Compounds, and Chemical Reactions	Worksheet: <i>Inorganic Nomenclature</i>	<i>Lab Techniques and Worksheet</i>			
4	Jan 29-Feb 2	3, 4	Molecules, Compounds, Equations, and Chemical Quantities	Tutorial only – no lab			<b>Exam 1</b>	
5	Feb 5-9	4	Chemical Quantities	<i>Limiting Reactants</i>		Friday, 2/9 during lecture		
6	Feb 12-16	4, 5	Aqueous Reactions, Gases	<i>Aqueous Solubilities of Ionic Compounds</i>	<i>Limiting Reactants</i>			
7 <sup>#</sup>	Feb 19-23	5	Gases continued	<i>Density of Air</i>	<i>Aqueous Solubilities</i>	Friday, 2/23 during lecture		
8	Feb 26-Mar 2	6	Thermochemistry	Tutorial only – no lab	<i>Density of Air</i>		<b>Exam 2</b>	
9	Mar 5-9	6, 7	Thermochemistry, Quantum Model of the Atom	<i>Analysis of Iron by Redox Titration</i>				
	Mar 12-16	<i>Spring Break</i>						
10	Mar 19-23	7	The Quantum Mechanical Model of the Atom	<i>Molar mass of a known and unknown acid</i>	<i>Iron Redox Titration</i>	Friday, 3/23 during lecture		
11	Mar 26-30	7, 8	The Quantum Mechanical Model of the Atom continued, Periodic Properties of the Elements	<i>Enthalpy of Formation of Ammonium Chloride</i>	<i>Molar Mass</i>			
12	Apr 2-6	8	Periodic Properties of the Elements continued	<i>Preparation of an Iron Oxalate Complex</i>	<i>Enthalpy of Formation</i>	Friday, 4/6 during lecture		
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14	Apr 16-20	9, 10	Chemical Bonding I: The Lewis Model continued, Chemical Bonding II: Molecular Shapes, etc.	<i>The shapes of molecules and Ions</i>	<i>Iron Oxalate Complex</i>			
15	Apr 23-27	10	Chemical Bonding II: Molecular Shapes, etc. continued	Tutorial only: Final Exam Practice	<i>Shapes of Molecules</i>			
16	May 2	ALL	FINAL EXAM: <i>Wednesday, May 2<sup>nd</sup>, 7:00-8:50pm</i>					<b>Final</b>

\*Monday Holiday: No lecture on January 15<sup>th</sup>.<sup>#</sup>Monday Holiday: No lecture on February 19<sup>th</sup>.