

# SYLLABUS

# CHEMISTRY 116

SPRING 2018

**LECTURE:** MWF 12:10PM Fulmer 201  
Tutorial and Laboratory times vary by section. Please consult your course schedule.

**INSTRUCTOR:** Dr. Michael Finnegan Fulmer 30A 335-5692 mgfinnegan@wsu.edu

**OFFICE HOURS:** 10:10AM-11:00AM MWF, 12:30PM-1:30PM Tu/Th. Office hours are open to everyone. Just stop by. There is no need (nor is it possible) to schedule an appointment to use office hours, just drop by. If you wish to schedule an appointment outside of office hours, please send the instructor an email specifying the day and time you would like.

**ONLINE COMPONENTS:** We will be using Blackboard Learn for course management and online information. This can be accessed via <https://learn.wsu.edu>. Use your WSU network ID and password to log in. All online aspects of the course including homework sets (MasteringChemistry), reading assignments (MasteringChemistry), and In Lecture Assignments (Learning Catalytics) should be accessed via the links on the Blackboard site. All e-mail communications to the course instructor and TAs should be via the Blackboard mail tool. Confidential information such as scores and grades may not be transmitted via unsecured email.

<b>GRADING:</b>	3 "midterm" exams	300	<b>GRADE RANGES:</b> (minimum points to achieve)			
	Homework problem sets	100	900 points	A	730 points	C+
	Reading Assignments	100	870 points	A-	700 points	C
	In Lecture Assignments	100	830 points	B+	670 points	C-
	Laboratory exercises (best 8 of 11)	200	800 points	B	630 points	D+
	Final Exam	<u>200</u>	770 points	B-	600 points	D
	<b>TOTAL</b>	<b>1000</b>	Less than 600 points: F			

**MIDTERM EXAMS:** Thursday Feb 8 6:00– 7:00 pm  
Thursday Mar 8 6:00– 7:00 pm  
Thursday Apr 12 6:00– 7:00 pm

**FINAL EXAM** Wednesday May 2 7:00pm (Comprehensive)

## REQUIRED COURSE MATERIALS:

**Text:** *Principles of Chemistry: a Molecular Approach, 4th Ed.* by Nivaldo J. Tro, Pearson education (2017). ISBN: 978-0-13-411283-1

**Mastering Chemistry Online:** First Day (Direct Digital Access)

First Day is a pilot program giving the student full access to electronic course materials on the first day of instruction. If a student "opts out" of First Day, they **will not** have access to the required homework, reading assignment, and in-class assignment 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/>.

**Lab Manual:** All laboratory information will be published on the Blackboard course site. There is no physical laboratory manual.

**Laboratory Notebook:** Duplicating with numbered pages. (Sold in Fulmer 318 for the first 2 weeks of the semester or at the book store, required)

**Goggles:** Required by OSHA and Departmental Policy. (Sold in Fulmer 318 for the first 2 weeks of the semester or at the book stores, required)

**Laboratory Coat:** (Sold in Fulmer 318 for the first 2 weeks of the semester or at the book store.). Required for Chem 116.

**Calculator:** A scientific calculator is required. Graphing calculators are allowed but not required. The use of any stored information/programs in a programmable calculator will be considered cheating. Calculators with a full alphabet keyboard (such as the TI-nspire series); PDAs; palmtops, laptops, handheld computers, and cell phone/calculator combinations may not be used during examinations. You are responsible for bringing your calculator to all tutorials, lectures, labs and exams.

**READING ASSIGNMENTS:** There will be reading assignments due before each lecture starting with the Wednesday, January 10<sup>th</sup> lecture (lecture #1). These consist of assigned sections of the text and questions intended to evaluate your

understanding of this material. The reading assignments are available on the MasteringChemistry site accessed via the Blackboard course site. Each assignment must be completed by 11:00AM on the day of the associated lecture. [So, the first reading assignment must be completed by 11AM Wednesday, January 10<sup>th</sup>.] Each reading assignment will be available a week before they are due (except the first 2 assignments). Each reading assignment is worth 4 points. Your score will be determined by multiplying your percent correct by 4 and rounding to the nearest ½ point. A maximum of 100 of the 164 points from the reading assignments will count toward the course grade. A portion of any reading assignment points obtained in excess of 100 points may be counted as extra credit at the end of the semester. 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.

**LECTURES:** Lectures must be attended on a regular basis. You will be expected to read the textbook AHEAD of coming to class. Lectures will supplement and clarify the information from your text rather than reiterate it. Lectures will focus on problem solving and demonstrations of chemical reactions. There will be in-lecture problem assignments via the Learning Catalytics website (accessible via the course Blackboard site). These will be graded and counted towards your total point score. These in-lecture assignments will be unannounced and cannot be made up. *Bring a calculator and web-enabled device to all lectures.* You are encouraged to form collaborative study groups and to sit with your group members during lecture.

**IN-LECTURE ASSIGNMENTS:** Most lectures will include problem assignments via the LearningCatalytics website (accessible via the Mastering Chemistry web site which is accessed via the course Blackboard site). These assignments will be identified as “In-Lecture Assignments” (ILA) in the grade book. These sessions are interactive and will require a Wi-Fi enabled device such as a smart-phone, laptop, or tablet. Each in-lecture assignment will be worth 4 course points and will be graded on both participation (50%) and correctness of answers (50%). There will be in excess of 160 points available from in-lecture assignments. A maximum of 100 points from the in-lecture assignments will count toward the course grade. A portion of any in-lecture assignment points obtained in excess of 100 points may be counted as extra credit at the end of the semester. Each in-lecture assignment will be available only during a portion of the associated lecture. There will be no make-up opportunities for in-lecture assignments. If you are not present for lecture for any reason, you will not have the opportunity to get those 4 points. If your Wi-Fi device and/or connection fails during the assignment, you will not have an opportunity to get the points for the portion of the assignment you are not able to complete. Make certain that the batteries are fully charged before arriving for lecture.

**HOMEWORK:** There will be weekly homework assignments consisting of a minimum of ten questions each. These assignments are administered by Mastering Chemistry and accessed through the course Blackboard site. You have access the Mastering Chemistry site via the First Day Program.

A new homework assignment will be made available each week (no later than 5:00PM each Monday). Each assignment must be completed by 8:00PM the following Monday in order to obtain credit. Each homework set will be pro-rated to have a value of 9 course points. Thus there will be 135 homework points available this semester. A maximum of 100 points from homework will count toward the final grade. A portion of any homework points obtained in excess of 100 points may be counted as extra credit at the end of the semester.

**TUTORIALS:** These are small classroom meetings associated with your laboratory section and led by your TA. Students who miss tutorial will **not** be allowed into the lab. Students who arrive at tutorial more than 15 minutes after its start are considered to have missed the tutorial and will not be allowed into lab. Tutorials are interactive problem solving sessions driven by your questions. Bring your calculator to tutorial. **Tutorial sessions are never canceled!** If your TA fails to arrive for a tutorial section, send one person to contact Ryan Rice (Fulmer 309) or Dr. Finnegan immediately. All others must remain in the tutorial room until the TA or a substitute arrives. Students who leave tutorial under these circumstances will forfeit all points associated with that tutorial/laboratory session.

**LABORATORIES:** Your course section includes a lecture time and a laboratory time. This is a laboratory UCORE course, thus the laboratory must be completed in order to pass the course. There will be 11 Laboratory experiments/reports this semester. Your best 8 laboratory scores will count toward your grade. Your lowest three scores (including zeroes) will be dropped. You must receive 8 non-zero lab scores in order to pass the class. A score of zero on four or more lab reports/worksheets will result in automatic failure of the course (a grade of **F**). Note that, if you do not complete and submit any portion of a lab report (pre-lab, data & observations, post-lab), you will receive a score of zero for that lab report. No credit will be given for completing 1 or 2 of the 3 parts of the report, only for complete reports.

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

**Pre-laboratory assignments:** Pre-laboratory assignment instructions are found on the course Blackboard site. The pre-laboratory is to be completed as a word-processed document saved in the .pdf format and uploaded via the link provided on the blackboard site. Pre-lab assignments must be submitted by 7:00AM on Tuesday of the week in which 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 assignment and be required to complete the pre-lab assignment before they are 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:** Procedures for each laboratory experiment will be posted on the course Blackboard site. Each student is expected to bring a printout or transcription of the procedure to the lab. 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. You are required to get your TA's signature on your data and observations and submit the original data/observation pages before you leave lab. **Failure to get your TA's signature and/or submit your original data pages at the end of the laboratory session will result in zero credit for that experiment.**

**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, sandals or shoes that expose any part of the foot are permitted. It is recommended that you purchase and use 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:** Post-laboratory assignments (post-labs) will be submitted as electronic copies via a link on the Blackboard site. The post-lab must be submitted by 8:00PM on the Wednesday of the week following the week in which the experiment was performed. The documents must be formatted as an Adobe pdf document. Specific requirements for the content of each post-lab will be found on the blackboard site. Failure to submit a laboratory report for an experiment will result in zero credit for that experiment (no credit will be given for the pre-lab or data & observations sections in the absence of a full report.) All post-labs are to be submitted online. Physical copies of the post-labs may not be submitted and will not be accepted. Late post-labs will not be accepted.

**Electronic submission:** It is the student's responsibility to submit the correct assignment (pre-lab and post-lab) before the due date/time. You are only permitted a single submission. If you submit the wrong document or encounter technical difficulties, you will need to contact your TA and have them delete the faulty submission before you can submit the correct one. This may take several hours and there will be no extensions to the due time. So, if you try to submit your document just before the due time and something goes wrong, it will not be corrected until after the due time. Your submission will be late and you will get a score of zero. It is highly recommended that you complete and attempt to submit your document at least 12 hours before the due time to allow for the possibility of technical problems and/or mistakes.

**Adjustments to laboratory scores:** In order to ensure that the grading of laboratory reports is consistent and fair, the instructor reserves 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 DURING THE SEMESTER. (After grades have been submitted, it is too late.)

**EXAMS:** There will be three midterm exams and a comprehensive final. All exams will be multiple choice. You will be responsible for bringing a calculator and a pencil to all exams. No notes or books or other electronic devices are allowed, including cell phones or any device with headphones. No make-up exams will be given. If you are unable to take a scheduled exam for documented academic reasons beyond your control, you will be allowed to schedule the exam at an earlier time. Midterm exams missed due to illness may be excused, with the other exams pro-rated to count for more, by specific arrangement with your instructor. The exams will be given in rooms other than the regular classroom. These rooms will be announced.

**FINAL EXAM:** The final exam for this course will consist of the "Second-term General Chemistry Exam" prepared by the American Chemical Society Division of Chemical Education. This is a comprehensive, multiple choice exam that will allow us to compare our results to those at other universities. The final exam will be on Wednesday, May 2<sup>nd</sup>, 2018, at 7PM in the same room as the midterm exams.

**FULMER 401:** All 100-level chemistry TA's hold their office hours in the TA room in Fulmer 401 (Monday through Thursday from 10 am to 4 pm, Friday from 10 am to 1 pm) You may ask any Chem TA for help in this course. Fulmer 401 has computers and software for your use in this course.

**CLASS POLICY ON LATE (OR EARLY) ASSIGNMENTS:**

**Laboratory Data & Observations, Laboratory Post-labs, Homework assignments, Reading assignments, & In Lecture assignments:** Late assignments will not be accepted. It is your responsibility to pay attention to due times and make certain that your assignments are completed/submitted on time. No extensions to the due times of these assignments will be granted for any reason. There will be no opportunity to make-up the points on any of these assignments once its due time has passed. In each of these categories, there are more points available than can be counted toward your final grade. Thus, missing a few assignments will not significantly impact your grade.

**Laboratory Pre-labs:** Pre-labs are the only assignments that may be submitted late, albeit for zero credit. The only reason to do this is to secure permission to complete the lab and avoid a zero for the entire lab report.

**Early submission:** Laboratory Pre-labs, Laboratory Post-labs, Homework assignments, and Reading assignments are submitted electronically and may be submitted early without penalty. In general, it will be possible to submit these assignment, at least, a week before the due time.

In Lecture Assignments and Laboratory Data & Observations are due during lecture and at the end of the lab respectively. These assignments may not be submitted wither early or late.

**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 exams, any communication between students during an exam, and/or actively looking at another student's paper during an exam. Use of any electronic device other than an approved calculator during an examination is cheating. Plagiarism also includes using laboratory data from another person or a previous semester. Unless assigned as partners for that specific experiment, two students with identical data are cheating. Three or more students with identical data are all cheating, even if the TA did nothing to stop them from doing so. Students who submit identical or near identical post-labs are cheating even if they are working form the same data. Students repeating the course must rework and rewrite all assignments. Plagiarism includes resubmitting lab reports from a previous semester, even if they were your own work. All incidences of cheating will be reported to the Office of Student Affairs. 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 a grade of F for the course and you will not be permitted to withdraw from the course.

**TROUBLESHOOTING ELECTRONIC SUBMISSIONS:** Homework, reading assignments and in-lecture assignments are completed on non-university websites (MasteringChemistry and learning catalytics) accessed via Blackboard. It is the student's responsibility to ensure that their web-enabled device and browsers are configured to properly interact with these websites. The majority of problems that students encounter are local to the student's device, browser, or internet connection. These problems must be addressed by the student with the help of the WSU IT help desk. **All students are expected to know how to clear the browsing history, cached web content, and stored site data on their device/browser combination.** Consult the help files for your device/browser for more information and remember that the WSU IT help desk is a better resource for help with network devices that your instructor or TA. Clearing the stored data on your browser will solve the majority of problems encountered in accessing the electronic assignments.

Please note that there are no extensions to due times for any reason including technical difficulties with your device, browser, and/or internet connection.

If you believe that there is a problem with either the Mastering Chemistry or learning catalytic site, please use the Help and support link on the site. Alternatively, you can call Pearson's WSU Priority Support line at (855) 875-1797.

**SCHEDULE****CHEMISTRY 116****SPRING 2018**

Wk	Dates	Chapter	Topic	Lab Experiment	Lab report (post-lab) due
1	Jan 8-12	11	Intermolecular forces, properties of liquids and solids, phase changes, phase diagrams.	None (tutorial will meet)	None
2*	Jan 16-19	13.1-13.5	Solutions and concentrations	Qualitative Analysis of Cations <b>Prelab due Tuesday</b>	None
3	Jan 22-26	13.6-13.8 14.1-14.3	Colligative properties Kinetics: rates and rate laws	Qualitative Analysis of Cations (Continued)	None
4	Jan 29- Feb 2	14.4-14.7	Kinetics: Integrated rate laws, activation energy, mechanisms	Qualitative Analysis of Anions <b>Prelab due Tuesday</b>	Qualitative Analysis of Cations Due Wednesday
5	Feb 5-9	15.1-15.6	Chemical Equilibrium	Qualitative Analysis of Anions (Continued)	None
6	Feb 12-16	15.7 16.1-16.4	Le Chateller's principle Acid/Base Theory	Unknown Cations Analysis <b>Prelab due Tuesday</b>	Qualitative Analysis of Anions Due Wednesday
7*	Feb 20-23	16.6-16.9	Acid/base Equilibria	Unknown Anions Analysis <b>Prelab due Tuesday</b>	Unknown Cation Analysis Due Wednesday
8	Feb 26-Mar 2	16.10-16.12	Structures and acidity	Unknown Salt Analysis <b>Prelab due Tuesday</b>	Unknown Anion Analysis Due Wednesday
9	Mar 5-9	17.1-17.4	Buffers, pH titrations	Colorimetry <b>Prelab due Tuesday</b>	Unknown Salt Analysis Due Wednesday
	Mar 12-16	<b>SPRING BREAK</b>			
10	Mar 19-23	17.5-17.8	Solubility constants, complex ion equilibria	TBA	Colorimetry due Wednesday
11	Mar 26-30	18.1-18.6	Entropy and free energy	TBA	TBA
12	Apr 2-6	18.7-18.10	Thermodynamics	TBA	TBA
13	Apr 9-13	19.1-19.6	Electrochemistry	TBA	TBA
14	Apr 16-20	19.7-19.9 20.1-20.6	Batteries, electrolysis, corrosion Radioactivity and nuclear decay	TBA	TBA
15	Apr 23-27	20.7-20.12	Nuclear chemistry: applications and safety	None (tutorial will meet)	TBA
	May 2 (Wednesday)	<b>FINAL EXAM (7 PM)</b>			

\* No Monday lecture due to holiday

**COURSE OBJECTIVES, LEARNING GOALS AND EXPECTED OUTCOMES**

<b>STUDENT LEARNING OUTCOMES:</b> At the end of the course the student should:	<b>Course Topics &amp; Dates</b> This outcome will be addressed:	<b>Evaluation of Outcome</b> This outcome will be evaluated primarily by:
Complete the development of 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) begun in Chemistry 105.	Throughout the semester.	Reading assignments, Homework assignments, In Lecture Assignments Laboratory Assignments/Reports, Exams
Learn the principles of thermodynamics as they apply to chemical equilibrium, including the relationships between equilibrium constants, free energy, enthalpy and entropy.	Throughout the semester.	Reading assignments, Homework assignments, In Lecture Assignments Laboratory Assignments/Reports, Exams
Apply the principles of equilibrium to solubility, pH, and electrochemical equilibrium in aqueous solution.	Throughout the semester.	Reading assignments, Homework assignments, In Lecture Assignments Laboratory Assignments/Reports, Exams
Learn and apply the principles of chemical kinetics as they apply to chemical reactions in general and how they are linked to and contrasted with equilibrium principles.	Throughout the semester.	Reading assignments, Homework assignments, In Lecture Assignments Laboratory Assignments/Reports, Exams
Learn and apply the principles of nuclear reactions, half-life and radiation safety.	Throughout the semester.	Reading assignments, Homework assignments, In Lecture Assignments Laboratory Assignments/Reports, Exams
Apply standard algorithmic calculation procedures, individually and in combination, especially relating to the properties of acid/bas and solubility equilibrium in aqueous solution.	Throughout the semester.	Reading assignments, Homework assignments, In Lecture Assignments Laboratory Assignments/Reports, Exams
Create procedures to solve problems by applying single and multiple concepts to new situations.	Throughout the semester.	Reading assignments, Homework assignments, In Lecture Assignments Laboratory Assignments/Reports, Exams
Apply chemical procedures and evaluate experimental results to develop an appreciation for the experimental basis of chemical knowledge and experimental methods through laboratory work, with special emphasis on qualitative analysis.	Throughout the semester in the laboratory.	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 the laboratory.	Laboratory Assignments/Reports

## **ATTENDANCE POLICY:**

**LECTURES:** Lecture attendance will not be tracked. There are no course points attached to attendance per se. There are, however, point bearing in-lecture assignments associated with each lecture. These must be completed during the lecture time but can be accessed from any location with internet service. Thus, attendance is not strictly required.

**TUTORIAL AND LABORATORY:** Tutorial and laboratory sections must be attended. If you fail to attend more than three tutorial/laboratory sessions (have more than three zero lab scores), you will fail the course. There is no penalty for missing up to three of these sessions. Note that tutorial must be attended in order to attend the associated laboratory session. Students who arrive for tutorial more than 15 minutes late will be denied entry to the lab and be given a score of zero for that laboratory report.

With the exception of the exams, all point bearing assignment categories offer more available points than can be counted toward your course grade. Thus, it is possible to miss several assignments in each category without an impact on your grade. Consult the individual assignment category descriptions for details. The inclusion of these extra points provides more than enough flexibility to accommodate the most common causes of course absence. Thus, there will be no extensions to due times/dates for any reason.

**COPYRIGHT AND INTELLECTUAL PROPERTY:** This syllabus and all course-related materials, presentations, lectures, *etc.* are my intellectual property and may be protected by copyright. Selling class notes through commercial note taking services, without my written advance permission, could be viewed as copyright infringement and/or an academic integrity violation, WAC 504-26-010 (3)(a,b,c,i). Further, the use of University electronic resources (*e.g.*, Blackboard) for commercial purposes, including advertising to other students to buy notes, is a violation of WSU's computer abuses and theft policy (WAC 504-26-218), a violation of WSU's Electronic Communication policy (EP 4), and also violates the terms of use for the Blackboard software program.

**ACCOMMODATIONS:** Reasonable accommodations are available for students who have a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit or call the Access Center (Washington Bldg, Room 217, 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations **MUST** be approved through the Access Center. Accommodations are available for students for whom examinations fall on days objectionable due to religious beliefs. Requests for such accommodation must be presented, in writing, to the course instructor at least one week prior to the examination.

**EMERGENCY NOTIFICATION SYSTEM:** "Washington State University is committed to enhancing the safety of the students, faculty, staff, and visitors. It is highly recommended that you review the Campus Safety Plan (<http://safetyplan.wsu.edu/>) and visit the Office of Emergency Management web site (<http://oem.wsu.edu/>) for a comprehensive listing of university policies, procedures, statistics, and information related to campus safety, emergency management, and the health and welfare of the campus community."

**CLASSROOM SAFETY:** 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, Fight](#)" 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](#).

**EXPECTATIONS FOR STUDENT EFFORT:** WSU academic regulation 27 states that a student is expected to spend three hours of time on course each week for each credit hour assigned to the course. One of these hours is the lecture time, the other two are work completed outside of the classroom. As this is a 4 credit course, a student can reasonably be expected to spend 8 hours per week working on course material outside of the scheduled class periods. This level of effort should be adequate to allow the average student to achieve a grade of C in the course. Higher grades will likely require a commensurate amount of additional time. As regulation 27 states: "Achievement of course goals may require more than the minimum time commitment."