

SYLLABUS

CHEMISTRY 106

SPRING 2014

LECTURES: MWF 8:10 & 3:10 in Fulmer 226

LABS/TUTORIALS: Tutorial rooms are given in the time schedule, lab immediately follows tutorial
Labs and tutorials meet the first and every week

INSTRUCTORS: 8:10 Lecture Prof. Scot Wherland Office: Fulmer 151 Phone: 509-335-3360
Email scot_wherland@wsu.edu or via Angel
Office Hours: Tu 9-10, W 4-5 and by appointment
3:10 Lecture Prof. Sue Clark Office: Fulmer 317A Phone: 509-335-1411
Email: s_clark@wsu.edu or via Angel
Office Hours: Tu noon-1, W 4-5, and by appointment

GENERAL CHEMISTRY COORDINATOR: Nikki Clark Phone: 509-335-1516 Email: Nikki_Clark@wsu.edu

INTERNET: We will be using Angel for the course website. Please access it using the following URL: <http://lms.wsu.edu/> or via zzzsis (<https://portal.wsu.edu/>). Use your WSU Net ID and password to log in. All class information, handouts, notices, and schedule changes are posted on this course website. It is your responsibility to check it regularly, and to check your wsu email address for announcements.

GRADING:

3 "midterm" exams	300	GRADE RANGES: (guaranteed minimum grade)			
11 quizzes (best 9)	180	900 points	A	885 A ⁻	870 B ⁺
14 homework sets (best 10)	100	800	B	785 B ⁻	770 C ⁺
11 laboratory experiments	220	700	C	685 C ⁻	670 D ⁺
Final Exam	200	600	D		
TOTAL	1000	Below 600	F		

MIDTERM EXAMS: Thursday, Feb. 13 **6:00–7:00 pm** (Ch. 12-14; Expts. 13 & 14)
Thursday, Mar. 13 **6:00–7:00 pm** (Ch. 15, 21, 16 (1st part); Expts. 15 & 16)
Thursday, Apr. 24 **6:00–7:00 pm** (Ch. 16 (2nd part), 17, 19 (1st part); Expts. 17-20)

FINAL EXAM: Thursday, May 8 **7:00 – 10:00 pm** (Ch. 19 (2nd part) 18 and Expts. 21-23, and Comprehensive)

PREREQUISITES for this class are: (You will be dropped if you do not meet these pre-requisites.)

You must have passed Chemistry 105 or its equivalent with a grade of C or better.

You must have passed or been placed beyond Math 106 or Math 107 or the equivalent. Courses that are considered beyond Math 107 are Math 140, 171, 172, 182, or 202.

TEXT: "Chemistry: The Science in Context", Gilbert, Kirss, Foster, and Davies 3rd Edition (Required).

COURSE OBJECTIVES, LEARNING GOALS AND EXPECTED OUTCOMES: Chemistry 106 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 106 will be able to:

1. 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.
2. Learn the principles of thermodynamics as they apply to chemical equilibrium, including the relationships between equilibrium constants, free energy, enthalpy and entropy.
3. Apply the principles of equilibrium to solubility, pH, and electrochemical equilibrium in aqueous solution.
4. 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.
5. Learn and apply the principles of nuclear reactions, half-life and radiation safety.
6. Learn the basic concepts of organic chemical nomenclature and some principle reactions as a preparation for more advanced study in later courses.

7. Apply standard algorithmic calculation procedures, individually and in combination, especially relating to the properties of acid/bas and solubility equilibrium in aqueous solution.
8. Create procedures to solve problems by applying single and multiple concepts to new situations.
9. 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.
10. 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.

ONLINE HOMEWORK: A registration code for the SmartWork online homework system is required. This is included with the new text bundle, or it can be purchased at the bookstores or online. It is also included with the eBook which can also be purchased online <http://books.wwnorton.com/books/buysmartwork/> . You will also need the enrollment key, which is **CHEM35699**. The procedure for registering for SmartWork the first time is available on Angel. If you bought the text bundle for Chem 105 in the Fall, your registration code should still be valid. In order to register for Chem 106 SmartWork, log in with the email and password you used last semester and use the “search” option to find Chem 106, then join the course using the enrollment key **CHEM35699** and enter the registration code that you purchased last semester. If you do not have your registration code, you can use the registration code lookup function at <http://wwnorton.com/gateway/getsmartworkregcode.asp> .

LAB TEXT: General Chemistry 105-106 Laboratory Manual, Star Publishing (2013 Edition) (Required)

LABORATORY NOTEBOOK: Duplicating with numbered pages. (Sold in Fulmer 318 for the first lab or at the book stores, required)

GOGGLES: Required by OSHA and Departmental Policy. (Sold during first lab or at the book stores) (Required)

LABORATORY COAT: (Available at the book stores or during the first lab.). Required for Chem 106.

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. By official University policy these Thursday evening exams take precedence over all other university activities.

QUIZZES: Quizzes are given in your scheduled tutorial. Quizzes will cover lecture and homework through the assignment due the previous Tuesday. If you are unable to take a scheduled quiz for documented academic reasons beyond your control, you may be allowed to schedule the quiz on a different day the same week. Permission must be given by your instructor in either case. There will be 11 quizzes of which the best 9 will count. The last quiz is thus an optional or make-up quiz, and is given during 15th week, covering material since exam 3 that will be on the final. You will be allowed to prepare a single 3" × 5" card containing your **HAND-WRITTEN** notes for use during each of the quizzes. No other handwritten material and no printed or photocopied material may be used during the quiz, except for an approved periodic table.

LECTURES: Lectures must be attended on a regular basis. Quiz and exam questions are based primarily on lecture material and homework. You will be expected to read the textbook and study the example problems **AHEAD** of coming to class. The lecture will supplement and clarify the information from your text rather than reiterate it.

TUTORIALS: These are small classroom meetings associated with your laboratory section and lead by your TA. Students who miss tutorial will not be allowed into the lab. Tutorials are interactive problem solving sessions driven by your questions, particularly on the material on the upcoming quiz and the current lab. The weekly quiz is given at the end of tutorial. Bring your text, lab manual and calculator to tutorial. Pre-labs and lab reports are due at the start of tutorial. Help with pre-labs and lab reports will not be available in tutorial as they must be completed before attending tutorial. Tutorial sessions are never canceled! If your TA fails to arrive for a tutorial section, send one person to contact your instructor or the General Chemistry office (Fulmer 319A) 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: The laboratory must be both attended and passed to pass the course. Failing the lab will result in a failing grade for the whole course. **Obtaining a score of zero for more than 2 experiments will result in an F for the course.**

Students Retaking the Course: Students who are retaking Chemistry 106 may be excused from lab based on their previous laboratory score if it is greater than 80% of the lab report points. Laboratory scores more than two years old will not be used. In order to be excused from lab, you must report to the General Chemistry Office (Fulmer 319A) and obtain written permission. Seek permission within the first week of the semester and do not assume you will be granted permission. You are still responsible for the content of the experiments on exams. **Students who have been excused from lab should attend all tutorials and are required to do all homework and quizzes.** Students who are retaking the class and are not excused from the lab must collect data and prepare lab reports for the experiments as if they have never done them before. Resubmitted work is not accepted.

Make-up labs: Labs missed for reasons beyond your control may be made up, on a space available basis, in the same week that the lab is missed. Permission for a make-up lab must be obtained, in writing, from the General Chemistry Office, Fulmer 319A. The permission slip will be collected and signed by the make-up TA. **We cannot guarantee that make-up space will be available.** If you know in advance that you will miss a lab, visit Fulmer 319A as soon as possible in order to maximize the chance that make-up space will be available. All course work due in tutorial is submitted to the TA of the section you are attending. The TA of the make-up section will get your work to your regular TA.

If make-up space is not available, in some cases a report may be written from data supplied by the instructor. Such reports are due at the normal time (in tutorial one week after you should have attended lab) and will be worth no more than half credit. A signed copy of the data from the professor must be submitted with the lab report. This means that the data cannot be e-mailed.

Pre-laboratory assignments: Pre-laboratory assignments are due at the start of the tutorial. Students who have not completed the pre-lab assignment (or completed the wrong assignment) will receive a 20% penalty on the entire laboratory report, but will be permitted to complete it outside the laboratory in Fulmer 319 after tutorial. Once the pre-lab is submitted to the TA, the student will have the remaining time to complete the laboratory work. No additional time will be allowed.

Laboratory procedure: Students are to perform the experiments individually unless otherwise instructed by the TA. 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 and 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 before you leave lab. Failure to do so 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 open-toed shoes are permitted. Short sleeves are acceptable, but sleeveless garments are not. The purchase and use of a lab coat will adequately cover the upper body, but your legs, ankles and feet must be covered by your 'street' clothing.

Laboratory reports: Laboratory reports will due at the start of the tutorial, on the assigned week (see schedule). 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-laboratory assignment in the absence of a report). The Results, Post-Lab Questions, and Discussion may be typed if you prefer.

Adjustments to laboratory scores: The instructors will make every effort to ensure that the grading of laboratory reports is consistent and fair. To this end, the instructor reserves the right to normalize the laboratory scores from the different laboratory TA's 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.

HOMEWORK: All homework will be done through the online system SmartWork, for which you must obtain an access code either with your textbook or from the SmartWork website. There are homework assignments due every week except week 1. The homework for a particular week can be done for credit starting at 8:00 am on Monday of that week and must be completed no later than 2:00 am Tuesday the following week. The problems can be done at other times, but will not count towards your homework score. The points assigned by SmartWork will be adjusted to a 0 to 10 scale when posted

to the Angel gradebook. A maximum of 100 points will be possible from the ten highest scoring homework assignments out of 14. The last homework is thus an optional or bonus assignment, and is given during 15th week, covering material since Exam 3 that will be on the Final Exam. Computers are available in the libraries and in Fulmer 401.

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 will be considered cheating. Cell phones, laptop computers, or similar devices may not be used during quizzes and examinations. You are responsible for bringing your calculator to all tutorials, lectures, labs and exams.

FULMER 319: All chemistry TA's hold their office hours in the TA room in Fulmer 319 (Monday through Thursday from 10 am to 4 pm, and 6 pm to 9 pm, and 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.

STEPHENSON TUTORS: The Chemistry Department provides tutors for Chem 106 in the Stephenson tutoring center Sunday through Wednesday evening from 6 to 9 pm. These tutors are available to all students in Chem 106.

ANGEL DISCUSSION FORUM: The Discussion section of Angel is open to everyone involved in the course. Through it you can post questions and get answers from other students as well as the instructors and TA's.

SMARTWORK QUESTIONS: Any questions about the SmartWork homework system, including chemistry questions and problems in formatting responses, should be submitted through the Angel discussion forum.

CLASS POLICY ON LATE (OR EARLY) ASSIGNMENTS:

Laboratory reports: Late laboratory reports will be penalized by the loss of 20% per weekday (or portion thereof) that they are late. Reports submitted after the start of tutorial are a day late. This penalty is applied after the normal grading of the report. For example, the score that you would otherwise earn is multiplied by 0.8 if any part of the report is 1 day late. Reports submitted more than one week late will receive zero points. No reports will be accepted after 5:00 pm on the last day of classes (May 2, 2014) even if they are not yet one week late.

Early submission: If you know that you will not be present at the time a laboratory report is due, it may be submitted early without penalty.

Method of submission: The only acceptable method of submission, other than directly to the instructor or your TA, is via the General Chemistry Office (Fulmer 319A). Material submitted to Fulmer 319A prior to 5:00PM each weekday (M-F) will be considered to have arrived at 5:00PM of that day for the purpose of determining the late penalty. Material submitted after 5:00PM will be considered to have arrived at 5:00PM of the following weekday. Assignments delivered in any other way (slid under the instructor's office door, for example) will be considered to have been submitted at the time they are found, if they are found.

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 or exams, any communication between students during a quiz or exam, and actively looking at another student's paper during a quiz or exam. Students repeating the course must rework and rewrite all assignments. Plagiarism includes resubmitting previously graded homework or lab reports, even if they were your own work. Plagiarism also includes using laboratory data from another person or a previous semester. All incidences of cheating may be reported to the Office of Student Conduct. 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 for the course and possible dismissal from the University.

ACCOMMODATIONS: Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

SAFETY: The campus safety plan is at <http://safetyplan.wsu.edu/> . Go to <http://oem.wsu.edu/Planning.html> to prepare for emergencies. The campus-wide alert system is at <http://alert.wsu.edu/> .

SCHEDULE**CHEMISTRY 106****SPRING 2014**

Wk	Dates	Chapter	Topic	Lab Experiment	Lab report due	Exam/Quiz	Homework due	
1	Jan 13-17	12	Solids	13: Intro to Qualitative Analysis	13 10 pts	None	None	
2*	Jan 20-24 MLKJ Day	13	Organic Chemistry: Fuels, Pharmaceuticals and Materials	14: Qualitative Analysis of Cations Prelab	None	Quiz 1	Hw #1 Tu 1/21	
3	Jan 27-31	13	Organic Chemistry (continued)	14 (Continued)	None	Quiz 2	Hw #2 Tu 1/28	
4	Feb 3-7	14	Thermodynamics: Spontaneous Processes, Entropy, and Free Energy	15: Qualitative Analysis of Anions Prelab	14 35 pts	Quiz 3	Hw #3 Tu 2/4	
5	Feb 10-14	15	Chemical Kinetics	15 (Continued)		Exam 1 Thu 2/13	Hw #4 Tu 2/12	
6*	Feb 17-21 Presidents Day	15	Chemical Kinetics	15 (Continued)	None	Quiz 4	Hw #5 Tu 2/18	
7	Feb 24-28	21	Nuclear Chemistry (also section 2.7)	16: Unknown Cations, Prelab	15 35 pts	Quiz 5	Hw #6 Tu 2/25	
8	Mar 3-7	16	Chemical Equilibrium	17: Unknown Anions, Prelab	16 15 pts	Quiz 6	Hw #7 Tu 3/4	
9 [#]	Mar 10-14	16	Chemical Equilibrium (continued)	18: Unknown Salt, Prelab	17 15 pts	Exam 2 Thu 3/13	Hw #8 Tu 3/11	
	Mar 17-21		SPRING BREAK					
10	Mar 24-28	17	Equilibrium in the Aqueous Phase	19: Colorimetric Determination of Concentration, Prelab	18 10 pts	Quiz 7	Hw #9 Tu 3/25	
11	Mar 13-Apr 4	17	Equilibrium in the Aqueous Phase (continued)	20: Determining an Equilibrium Constant, Prelab	19 20 pts	Quiz 8	Hw #10 Tu 4/1	
12	Apr 7-11	17	Equilibrium in the Aqueous Phase (continued)	21: Kinetics, Prelab	20 20 pts	Quiz 9	Hw #11 Tu 4/8	
13	Apr 14-18	19	Electrochemistry and the Quest for Clean Energy	22: Titration of a Polyprotic Acid, Prelab	21 20 pts	Quiz 10	Hw #12 Tu 4/15	
14	Apr 21-25	19	Electrochemistry and the Quest for Clean Energy (continued)	23: Voltaic Cells and Reduction Potentials, Prelab	22 20pts	Exam 3 Th 4/24	Hw #13 Tu 4/22	
15	Apr 28-May 2		Finish and Review	Course Evaluations Online	23 20 pts	Quiz 11 ^{&}	Hw #14 ^{&} Tu 4/29	
	May 8		FINAL EXAM THURSDAY MAY 8 (7 – 10 PM)					

* No Monday lecture due to holiday, homework is still due on Tuesday 8:00 am and the quiz is on Friday this week.

No Friday lecture

& The homework and quiz that are due the last week only count if they are better than one of your previous 9 best quizzes or 10 best homework assignments, thus they are optional or make-up assignments that will help you prepare for the new material on the Final Exam.