

CHEM 208

SPRING 2022

GENERAL CHEMISTRY II

T-R 8-9:20 am @ ISC1221

Instructor: Dr. Cemile Kumas

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Office Hours: Tuesday, 11 – 12, Thursday, 10-11, or by appointment

Mandatory Materials:

1) OpenStax Chemistry: *Atoms First, 2e*, Available as free pdf or \$65 hard copy

<https://openstax.org/details/books/chemistry-atoms-first-2e>

2) Introduction to Inorganic Chemistry, Available for free at

https://en.wikibooks.org/wiki/Introduction_to_Inorganic_Chemistry

3) Achieve Homework (HW): (\$42) Sign up for Chem 208_01 (General Chemistry II, Openstax), Spring22, Kumas: <https://achieve.macmillanlearning.com/courses/h5wsyv>

There are 10 total HWs and each worth 10 points. HW#Extra (review of Gen Chem I) is extra credit and 10 points. HWs are unpenalized (unlimited attempts without penalty) and due on Saturdays at 11:59 pm (please see tentative schedule below for exact dates). Late submissions will be penalized 10% per day.

Course Delivery: mostly in person. All lectures will be recorded and placed on Blackboard. Technical issues may arise it is better to come to live classes! Course related materials such as lecture templates/notes, exam keys and announcements will be posted on Blackboard (www.blackboard.wm.edu).

Class Attendance: In accordance with College policy, class attendance is expected and imperative for success in this class! See undergraduate catalog for more information. Attendance may be recorded on a few occasions this semester.

Grading: 200 Pts - Midterm 1 (2/24)
200 Pts - Midterm 2 (3/31)
200 Pts - Midterm 3 (4/21)
100 Pts – Achieve Homework (+One extra credit HW)
300 Pts - Cumulative Final Exam
1000 Pts Total

The traditional 90%/80%/70%/60% grade cutoffs will be followed in the course.

Mid-Terms: All mid-terms will be (closed-book, closed-note) given during class time. **NO MAKE-UP MID-TERM EXAMS WILL BE GIVEN.** For excused absences, the remaining exams and final will be weighted more heavily (25% and 40%, respectively) to account for the missed exam. If you know that you will have a conflict with a scheduled exam due to a College function such as varsity sports, choir, etc., please notify me **in advance** of your absence. Unexcused absences for scheduled mid-terms, including early departures or late returns from weekends/spring break, fraternity/sorority functions, family reunions, etc. will result in a grade of zero for the missed exam.

Important dates:

Add/Drop period: January 25 – February 4

Withdrawal period: February 5 – March 28

Diversity & Inclusion Vision Statement: The College of William & Mary values and actively nurtures an environment of diversity and inclusiveness where every individual, regardless of how we may differ – for example, but not limited to, with regard to race, religion, gender, ethnic origin, age, socioeconomic status, political preferences, physical abilities, or sexual orientation – is embraced, respected, and afforded the same opportunity to grow, to succeed, and to contribute to William & Mary’s success.

Student Accessibility Services: Students with disabilities must contact the Student Accessibility Services in the Dean of Students office to arrange for special accommodations or extra-time during exams. Any student who feels he/she/they may need an accommodation based on the impact of a learning, psychiatric, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2509 or at sas@wm.edu to determine if accommodations are warranted and to obtain an official letter of accommodation. For more information, please see www.wm.edu/sas. If you anticipate requiring specific accommodation based on documented disabilities, please let me know *no later than January 24* (by response to question 11 on the course survey, an e-mail or personal contact) so I can make adjustments to minimize their impact on your performance in this class.

Mental and Physical Well Being: William & Mary recognizes that students have many different responsibilities and can face challenges that make learning difficult. There are many resources available at W&M to help students. Asking for help is a sign of courage and strength. Please reach out to me if you or someone you know are facing problems inside or outside the classroom, and I will do my best to guide you to appropriate resources on campus. Those resources include:

- For psychological/emotional stress, there is the W&M Counseling Center (757-221-362), 240 Gooch Dr. 2nd floor, <https://www.wm.edu/offices/wellness/counselingcenter/>. Services are free and confidential.
- For physical/medical concerns, there is the W&M Health Center (757-221-4386), 240 Gooch Drive, <https://www.wm.edu/offices/wellness/healthcenter/>
- For other additional support or resources, please contact the Dean of Students by submitting a care report (757-221-2510) or by email at deanofstudents@wm.edu

Honor Code: All students are bound to the Honor Code. There will be **zero tolerance for cheating** and all incidences will be reported to the honor system. See the student handbook for more information on the honor code. Any violation of the integrity of this course on the part of a student may result in a **ZERO on the assignment (HW, Quiz, Exam, etc.)** and filing of the incident with the William and Mary Student Honor Council.

Practice Problems: All answers are in back of Textbook. You may need to refer to constants in the various appendices. Detailed solutions are available in Student Solutions manual on OpenStax Website (<https://openstax.org/details/books/chemistry-atoms-first-2e>)

Lecture 1 Ch 14: 1-25 (odd)

Lecture 2 Ch 14: 27, 29, 33 - 39 (odd), 45, 47, 48 - 62 (even), 66, 68

Lecture 3 Ch 14: 70 - 76 (even)

Lecture 4 Ch 14: 78 - 94 (even)

Lecture 5 Ch 15: 1 - 39 (odd), 47, 53 - 57 (odd)

Lecture 6 Ch 15: 66 - 70 (even), 76, 86, 93 - 97 (odd), 101

Lecture 7 Ch 12: 1 - 19 (odd)

Lecture 8 Ch 12: 21 - 33 (odd), 37, 50

Lecture 9 Ch 12: 39, 41, 42, 46, 48; Ch 13: 90, 96; Ch 16: 1, 5 - 9 (odd)

Lecture 10 Ch 16: 11 - 25 (odd)

Lecture 11 Ch 16: 27 - 31 (odd)

Lecture 12 Ch 16: 33, 34, 36

Lecture 13 Ch 16: 38 - 46 (even)

Lecture 14 Ch 5: 1 - 9 (odd), 11 - 17 (odd, ignore specific shape names), 19

Lecture 15 Ch 5: 21 - 25 (odd), 29 - 47 (odd)

Lecture 16 Ch 19: 1, 3, 7, 25, 27

Lecture 17 Ch 19: 37 - 43 (odd), 47

Lecture 18 Ch 19: 33, also see problems at the bottom of the Also see problems at the bottom of chapter 5 at https://en.wikibooks.org/wiki/Introduction_to_Inorganic_Chemistry

Lecture 19 Ch 17: 1, 7 - 31 (odd), 36

Lecture 20 Ch 17: 38 - 46 (even)

Lecture 21 Ch 17: 50, 52, 56 - 62 (even), 68 - 86 (even)

Lecture 22 Ch 20: 1 - 31 (odd), 43, 45

Lecture 23 Ch 20: 47, 49, 53, 57

Tentative Course Schedule*

<i>Date</i>	<i>Topic</i>	<i>Assigned Readings, Studying</i>	<i>HW "due"</i>
1/27	L1: Acids & Bases; Brief equilibrium Review	Review p. (351-4); Chap 13; Read 14.1, 2, 3(742-5), 5; 15.2	
2/1 2/3	L2-3: pH Scale; Acid/Base equilibria; Polyprotic acids & Linked equilibria; pH properties of salts	Read 14.2, 3(739-752),4; 15.3; W3.1	#Extra** #1 (2/5)
2/8 2/10	L4-5: Neutralization rxns; Common Ions & Buffers	Read 14.6; 15.1	#2 (2/12)
2/15 2/17	L6-7: Titrations & Solubility	Read 348-351; 14.7; 15.1, 2, 3	#3 (2/19)
2/22 2/24	L8: Enthalpy & Entropy, Laws of Thermodynamics; Free Energy (ΔG) MIDTERM #1 Aqueous Equilibria	Review 9.3; Read 12.1,2 Read 12.3,4; 679-680; 13.4(706-712)	
3/1 3/3	L9-10: ΔG under Non-standard State Conditions; Redox & Electrical Energy from Chemical Energy;	Read 16.1-16.3; W4.2	#4 (3/5)
3/8 3/10	L11-12: Nernst, Batteries, Corrosion & Electrolysis	Read 16.4-16.6; W4.4	#5 (3/12)
3/12-3/20	SPRING BREAK		
3/22 3/24	L13-14: Electrolysis (cont.) & VSEPR & Hybridization	Read 16.7; W4.3	#6 (3/26)
3/29 3/31	L15: Hybridization & Molecular Orbital Theory MIDTERM #2: Thermodynamics & Electrochemistry	Read 4.6, 5.1-3; If needed, review 3.3-4; 4.1,2,4,5; 6.3-4; 7.3-6	
4/5 4/7	L16-17: Transition Metals & Coord. Chem	Read 5.4; 19.1,2; W3.2; 5.1,2,4,10	#7 (4/9)
4/12 4/14	L18-19: Magnetism of Coord. Comp., Intro to Kinetics	Read 19.3; W5.3,5-9	#8 (4/16)
4/19 4/21	L20: Kinetics, Rate Laws MIDTERM #3: Orbitals & Transition Metal Chemistry	Read 17.1-4	
4/26-4/28	L21-22: Kinetics: Theory, Mechanism & Catalysis	Read 17.5-7	#9 (4/30)
5/3-5/5	L23-24: Nuclear Chem & Radioactive Decay	Read 20.1-5	#10 (5/7)
5/16	Cumulative FINAL EXAM - (Monday 2-5 pm)		

* Subject to change by acts of nature, unanticipated events, etc. Any changes will be announced in class and on the BB. Cancelled lectures will be made up via Blackboard Panopto lecture capture: Exams will occur next available class meeting.

**Extra credit: HW#Extra: Review problems from General Chemistry I (10 points)

† Openstax readings colored teal; Wikibook readings colored crimson

‡ Answers for selected OpenStax problems are in the back of the textbook with complete solutions in the Student Solution Guide.