Syllabus for Chemistry 163: College Chemistry (4 credits, offered in-person). Updated 5 September 2022

While not required, Iowa State University encourages the use of face masks in indoor settings including all classrooms and learning spaces to mitigate the spread of COVID-19. The university additionally encourages all members of the campus community to be vaccinated. Substantial scientific evidence indicates that these actions prevent severe illness and significantly mitigate the spread of COVID-19 and its known variants. The official, required syllabus statement disseminated by Provost Wickert is:

"If you are not feeling well, you should stay home and focus on your health. Should you miss class due to illness, it is your responsibility to work with your instructor to arrange for accommodations and to make up coursework, as consistent with the instructor's attendance policy.

"You may choose to wear a face mask and/or receive the COVID-19 vaccine and boosters, as well as other vaccines such as influenza, but those options are not required. Thielen Student Health Center will continue to provide COVID-19 vaccinations free-of-charge to students. The university will continue to offer free masks and COVID-19 test kits during the fall 2022 semester. Other wellbeing resources for students are available at: https://www.cyclonehealth.iastate.edu/wellbeing-resources/

Public health information for the campus community continues to be available on Iowa State's public health website. All public health questions should be directed to publichealthteam@iastate.edu."

Chem 163. College Chemistry. *(4-0) Cr. 4. F.S. Pre-req: 1 year of high school algebra and geometry and Chem 50, or 1 year of high school chemistry; and credit or enrollment in CHEM 163L A general survey of chemistry with an emphasis on conceptual problems for those who are not physical and biological science or engineering majors. Nomenclature, chemical reactions, stoichiometry, atomic structure, periodic properties, chemical bonding, states of matter, solutions, thermochemistry, acid-base theory, oxidation-reduction reactions, basic chemical kinetics, and chemical equilibrium. Only one of Chem 163, 167, 177, or 201 may count toward graduation.*

Prerequisites: Students in Chem 163 should have had basic high school chemistry AND an arithmetic and algebra course in preparation for the mathematics in this curriculum. Course work and exams will include calculations involving fractions, percent, exponents, scientific notation, logarithms, writing and solving algebraic equations, and general algebraic problem-solving techniques.

Chem 163L. Laboratory in College Chemistry. *1 Cr. Pre-req: Credit or enrollment for credit in 163. Laboratory to accompany 163.* ***MUST BE TAKEN WITH 163.*** *Only one of Chem 163L, 167L, and 177L may count toward graduation.* ***Dr. Sara Pistolesi (sarachem@iastate.edu) is the instructor for Chemistry 163L. Laboratory-related questions should be directed to her.*** Chem 163 and 163L are ***co-requisite*** courses. This means that students in Chem 163 are required to take Chem 163L at the same time or to have already received credit in 163L. Corequisite course requirements are strictly enforced: Students who do not meet the co-requisite should drop the course or **will receive an F in it.** Students who drop or audit Chem 163 will be required to drop 163L and *vice versa*.

Labs meet the first week of class!
In the first week of classes, use AccessPlus to add, drop, or make section changes.
After Friday, 26 August, email isuchemistry@iastate.edu to add or make section changes. For drops, contact your academic adviser.
If you NEED a section that is full, email isuchemistry@iastate.edu IMMEDIATELY!

Some Important Course Dates. (See the online Academic Calendar for all dates.)

26 Aug., Friday. Last day to drop full-semester or first half-semester courses without the drop appearing on the permanent record or counting toward the limit of dropped courses.
2 Sep., Friday. Last day to elect to audit a course for fall. The instructor of the course must approve an audit.
28 Oct., Friday. Last day to add/drop full-semester courses or withdraw without extenuating circumstances.

Instructor: Professor J. W. Petrich; **email:** chem163q@iastate.edu; **phone:** email preferred; **Office hours:** Monday in person, 8:35-9:35 a.m., 3:05-4:05 p.m., 0773 Gilman; or by appointment *via* Webex or in person.

Head TA: Mahsa Askary Hemmat; **Office Hours**: Monday, 9:00-10:00 a.m., 1761 Gilman (Chemistry Help Center)**. The head TA (teaching assistant) is the primary contact (chem163q@iastate.edu) for all administrative issues concerning the course.**

Morning section: Mon., Wed., Fri. 7:45-8:35 a.m., Gilman 1002, plus recitation section on Wednesday
Afternoon section: Mon., Wed., Fri. 2:15-3:05 p.m., Gilman 1002, plus recitation section on Wednesday

Recitation sessions are on Wednesday of each week when there is no examination (see below). A recitation is a small, classroom session led by a teaching assistant (TA). In recitation you will discuss homework and class material and take a quiz. Show up to recitation prepared to ask questions and engage in thoughtful discussion. Help foster a positive learning environment for yourself and others, regardless of your performance in the course. **Always treat your TA with respect and dignity.** *If no TA shows up for your recitation/laboratory section, send one student to 1608 Gilman to find a substitute TA. The department will find a substitute as soon as possible.*

Contacting the Instructor and the Head TA. You are encouraged to contact me or the Head TA whenever you need help with the course material or you have other questions about the course. You will receive a response within 24 hours. **Use email (**chem163q@iastate.edu**) for questions that are personal in nature** (scheduling an appointment, SAS, *etc*.)

Canvas. https://canvas.iastate.edu/. Canvas will be our online course interface. Important announcements, this syllabus, lecture notes, grades, as well as other useful information are posted throughout the semester on Canvas. Check Canvas announcements often.

Expected behavior in community is to be professional, courteous, and respectful. (This is a matter of general importance that should be applied in all your courses and will be *expected* to be applied in a job setting.)

- All communication within the course should adhere to university standards of Netiquette at ISU. Specifically, communication should be scholarly, respectful, professional, and polite.
- You are expected to follow ISU's Principles of Community.
- You are encouraged to disagree with other students, but such disagreements need to be based upon facts and documentation. It is my goal to promote an atmosphere of mutual respect in our interactions. Please contact me if you have suggestions for improving the interactions in this course.
- Professional and respectful tone and civility are used in communicating with fellow learners and the instructor, whether the communication is by electronic means, by phone, or face-to-face.
- Video interactions must reflect a respectful tone in verbal communications and body language.
- In email, include Chem 163 (and other relevant key words, if necessary) in the subject line.
- Treat an email as *professional correspondence*.

Learning Objectives. Upon successful completion of the course, students will have refined their study skills (*i.e*., preparing for lectures, quizzes, and exams; studying consistently and effectively), will be conversant in the language of chemistry, and will have learned to appreciate the importance of chemistry and science in their everyday lives. Students will be able to understand:

- The scientific method.
- The basic structures of atoms, ions, and molecules, and ways to describe the properties of atoms and molecules in the various phases of pure matter and in mixtures quantitatively.
- The reactivity of atoms, ions, and molecules, and the various qualitative and quantitative methods for describing, depicting, and balancing chemical reactions.
- The concept of chemical equilibrium.
- The concepts of acids and bases.
- How to use the periodic table as an organized resource of chemical knowledge.
- How to correlate the electronic configurations of atoms and the structures of molecules with their physical and chemical properties.
- How to use the language of chemistry (nomenclature, terminology, and symbolic representations).
- How to visualize the structure of matter and its reactions at the atomic and molecular level.
- How to solve quantitative problems using basic mathematical skills.

Schedule of Topics[a], Exams[a], and Quizzes[b]. No classes on 5 Sept. or the week of 21-25 Nov.

Date	Chap.	Module[c]	Topic
22, 24 Aug. (lectures 1-2)	1	1	Syllabus; Introduction, What is Chemistry?
26, 29, 31 Aug. (3-5)	2	2	The Numerical Side of Chemistry
2, 7, 9 Sept. (6-8)	3	3	The Evolution of Atomic Theory
12 Sept. (9)	4	4	The Modern Model of the Atom
Exam 1	**Wednesday, 14 Sept.: 6:45-8:00 p.m.**		
16, 19 Sept. (10-11)	4	4	The Modern Model of the Atom (continued)
21, 23, 26 Sept. (12-14)	5	5	Chemical Bonding and Nomenclature
28, 30 Sept., 3 Oct. (15-17)	6	6	The Shapes of Molecules
Exam 2	**Wednesday, 5 Oct.: 6:45-8:00 p.m.**		
7 Oct. (18)	7	7	Intermolecular Forces and the Phases of Matter
10, 12, 14 Oct. (19-21)	8	8	Chemical Reactions
17, 19, 21, 24 Oct. (22-25)	9	9	Stoichiometry and the Mole
Exam 3	**Wednesday, 26 Oct.: 6:45-8:00 p.m.**		
28, 31 Oct., 2, 4, 7 Nov. (26-30)	12	10	Solutions
9, 11, 14 Nov. (31-33)	13	11	When Chemistry Turns into Products
Exam 4	**Wednesday, 16 Nov.: 6:45-8:00 p.m.**		
18, 28, 30 Nov. (34-36)	14	12	Chemical Equilibrium
2, 5, 7, 9 Dec. (37-40)	15	13	Electrolytes, Acids, and Bases
Final Exam (*required for all students*), week of 12 Dec., to be announced midsemester by the Registrar)[d]			

[a] Dates for given topics are tentative. (Lecture numbers are highlighted in red.) Exam dates and times, however, are not subject to change. No new material is covered on days on which there is an examination. I will, however, be present during the scheduled lecture time to answer questions.

[b] Recitation quizzes will be administered *every Wednesday*, *beginning 24 August*, on which an examination will not be administered. No quizzes are administered on days on which there is an examination.

[c] The module number refers to videos posted on Canvas that treat the corresponding lecture material.

[d] The final exam date and time will be scheduled by the Registrar's Office.
When they are set, an announcement will be sent to all students. The ISU final examinations policy will be followed absolutely: http://www.registrar.iastate.edu/students/exams. Students who have three or more finals on the same calendar day may request to reschedule a final. The instructor of the course having the smallest number of students is responsible for arranging an alternate examination time for the student unless make-up exam times are available in one of the other courses. There will be no exceptions. **The deadline to request an alternative time for the final exam is 4 pm on the Friday prior to Prep Week.**

Required Course Materials

- A scientific calculator with at least ln(x), exp(x), log(x), 10^x, and y^x functions. Programmable and graphing calculators ***are not permitted for exams or quizzes***.
- Textbook: *Introductory Chemistry*, Russo and Silver, 5th Ed. (ISBN: 978-0-321-92711-8). The hard copy is available for purchase in the ISU book store. Alternate formats are acceptable, but you are responsible for acquiring them and accessing them yourself. **This book is NOT the book required for the laboratory course and *vice versa*.**

Assignments and Grading

Homework will be assigned each week. It is impossible for you to succeed in this course without doing the homework problems. Examination questions will be based upon your understanding of this material. You should start the assignments as soon as possible. If you have difficulties with problems, you need to contact me or the TAs to resolve them. Answers to the problems will either be available in your assigned text or will be posted before examinations or both. **There will be no make-**

up homeworks. The **two lowest** homework scores will not count towards the grade. **Homework must be submitted at the beginning of recitation.**

Recitation Quizzes. An ~15-30 min. quiz will be given during **every** recitation session unless otherwise noted. A quiz will be given on the day of the first recitation. **It is NOT your TA's responsibility to prepare you for the quiz. You must take responsibility for this by actively asking questions about homework and class material you do not understand. There will be no make-up quizzes.** The **two lowest** recitation quiz scores will not count towards the grade. Quizzes should be treated as miniature exams and studied for accordingly.

Graded quizzes will be returned the following recitation. Any request for regrading should be clearly given in writing on a separate piece of paper (or on the quiz in a different color pen) and submitted with the quiz **before** leaving the recitation room. The entire quiz is subject to regrading. If you are not present when the quiz is handed back to the class (the recitation following when it was taken), the quiz will not be regraded. (It is possible, therefore, in this case that this quiz will be among the low scores not included in the computation of your grade.)

No quizzes are given on days on which there is an examination. The assigned homework must, however, be turned in at the beginning of the recitation period or submitted by that time electronically to your TA. The TA will be present the entire recitation to answer questions to help you review for the examination.

Continuous Improvement Progress (CIP) Quizzes. It is mandated by the State of Iowa that a course with an enrollment of at least 100 students in all of its sections be assessed. To this end, you will be administered a quiz on the first day of recitation, and at the end of the semester, covering material you are expected to have mastered in this course. **This quiz is solely for the purpose of gathering information. It does not count for your grade.**

"Midterm" Examinations. There will be 4 "midterm" examinations during the semester on the following Wednesdays from 6:45-8:00 p.m.: 14 September; 5 October; 26 October; and 16 November. Each midterm exam will focus on that section's material but may include some material covered in previous sections (semi-cumulative). The lowest of the four midterm exams will be dropped. If you miss an exam, a zero will be registered for it on Canvas and will count as your lowest midterm exam grade. If you have a valid, serious reason (*e.g.*, work, hospitalization, death in the family) to miss an exam, you need to contact me or the head TA immediately (at 163q@iastate.edu) to arrange accommodations ***as soon as possible*** prior to the exam. **There are no make-up exams**.

Grades will be posted on Canvas as soon as possible before the next recitation meeting. If you feel that there was an error in your grade, you must request in writing **at this recitation meeting** that the grading and posting be rechecked. The entire exam will be subject to regrading. If you are not present in recitation following the exam you must make an appointment within five ISU school days with your recitation TA to discuss if regrading is necessary. No other requests for regrading will be entertained.

Final Examination. The final examination will be given on a date and at a time to be determined, as noted above. The final examination cannot be dropped and must be taken. ***There is no make-up final or replacement exam for the final. Failure to take the final without a documented, legitimate excuse will result in failure in the course.***

For quizzes and examinations, you are permitted pens and pencils. Unless otherwise noted, you are permitted a nonprogrammable, nongraphing calculator. All calculators are subject to inspection during quizzes and examinations.

Grading. The final grade will be computed according to the following algorithm:

Homework: 10%
Recitation Quizzes: 20% (drop lowest two)
Midterm Exams: 45% (the best three scores among exams 1, 2, 3, and 4, each being worth 15%)
Final (Cumulative) Exam: 25% (must be taken)

Tentative grading scale (grades are rounded to three significant figures):

100 – 93.0 %	A	79.9 – 77.0 %	C+	69.9 – 67.0 %	D+
92.9 – 90.0 %	A-	76.9 – 73.0 %	C	66.9 – 63.0 %	D
89.9 – 87.0 %	B+	72.9 – 70.0 %	C-	62.9 – 60.0 %	D-
86.9 – 83.0 %	B			< 60.0 %	F
82.9 – 80.0 %	B-				

For example, if the averages of your homework, your quizzes, your midterms are 60%, 77%, and 80%, respectively, and if you score 92% on the final exam, your final numerical grade is 0.10(60) + 0.20(77) + 0.45(80) + 0.25(92) = 80.4, which corresponds to a letter grade of B-. You are always able to compute your current grade. (This is important to keep in mind, because Canvas sometimes computes your grade "by itself" using default grading criteria.) For purposes of computation, each homework, quiz, or exam score is taken as a percentage: *e.g.*, 17/20 on a quiz corresponds to 85%.

Final Grades. Final grades are based solely on graded work and are NOT negotiable; no student will be offered make-up assignments or extra credit. **Respect the deadlines for appeals concerning grading and posting of grades.** Visit the ISU Catalog website for the grading policies regarding incomplete marks,

Help Center. The department of chemistry provides help to all general chemistry students in the *Martha E. Russell Chemistry Help Center and Resource Room* in Gilman 1761. It is open MTWR from 9 a.m. to 6 p.m. and Fridays from 9 a.m. to 1 p.m. The Help Center is staffed by general chemistry teaching assistants. Solutions manuals and general chemistry textbooks, study guides, and workbooks are available. Resources in the Help Center may not be removed from the room. *Note – please do not expect the TA's in the Help Center to do your homework for you. Instead, ask thoughtful, general questions that address your points of confusion.*

Supplemental Instruction (SI). CHEM 163 is supported by Supplemental Instruction (SI). **SI is optional.** SI is an internationally known academic support model that uses peer-assisted study sessions to improve student retention and success within targeted historically difficult courses. SI is completely free for students, they do not need to sign-up and can come and go as they please. SI is housed within the Academic Success Center at Iowa State and is coordinated by a team of academic support professionals. You can learn more about SI on its website at www.si.iastate.edu.

Illness or Other Emergencies: If you have a health issue or other emergency that requires you to miss multiple classes, you are advised to contact the Dean of Students Office (http://www.dso.iastate.edu/sa) who can notify all of your instructors on your behalf. You also should keep your academic adviser informed of your situation.

Academic Misconduct. All acts of dishonesty in any work constitute academic misconduct. (Online courses are no exception.) The Student Disciplinary Regulations (http://policy.iastate.edu/policy/SDR) will be followed in the event of academic misconduct. Depending on the act, a student could receive an F grade on the test/assignment, F grade for the course, and could be suspended or expelled from the University. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing attempt to help another student commit an act of academic dishonesty. See more information at Academic/Research Misconduct for Students.

Accommodations. Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact your instructor to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with your instructor, you will need to obtain a SAS form with recommendations for accommodations from the Student Accessibility Services located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-7220 or email accessibility@iastate.edu. Retroactive requests for accommodations will not be honored.

Religious Accommodation. If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Free Expression. Iowa State University supports and upholds the First Amendment protection of freedom of speech and the principle of academic freedom in order to foster a learning environment where open inquiry and the vigorous debate of a

diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

Harassment and Discrimination. Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact the course instructor, Student Assistance at 515-294-1020, or email studentassistance@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Accessibility Statement. Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to work directly with staff in Student Accessibility Services (SAS) to establish eligibility and learn about related processes before accommodations will be identified. After eligibility is established, SAS staff will create and issue a Notification Letter for each course listing approved reasonable accommodations. This document will be made available to the student and instructor either electronically or in hard-copy every semester. Students and instructors are encouraged to review contents of the Notification Letters as early in the semester as possible to identify a specific, timely plan to deliver/receive the indicated accommodations. Reasonable accommodations are not retroactive in nature and are not intended to be an unfair advantage. Additional information or assistance is available online at www.sas.dso.iastate.edu, by contacting SAS staff by email at accessibility@iastate.edu, or by calling 515-294-7220. Student Accessibility Services is a unit in the Dean of Students Office located at 1076 Student Services Building.