CHEM 131
General Chemistry

Spring 2023
MWF 9:30-10:30 am
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Office hours: See Canvas

Mental Health Statement

You may encounter difficulties during the course of this term, as we all do from time to time. If you feel that personal circumstances are preventing you from succeeding in this class, you are encouraged to speak with me as early as you can so that we can plan a reasonable path forward. If I am unable to offer you an appropriate level of support, I will do my best to connect you with other resources we have on and off campus. I want you to be safe and supported so that you can get the best educational experience possible.

If you or someone you know has a history of mental health concerns or if you are unsure and would like a consultation, a variety of confidential services are available. If you find yourself experiencing these issues, please consider taking advantage of the resources available. Horizon Health Services are located on campus in the Health and Wellness center in the basement of the Chapel. Counselors are on campus and available for appointments Monday-Friday from 9 a.m. to 5 p.m. Students may schedule appointments by calling 434-946-2316. You can also email questions to HorizonBehavioralHealth@sbc.edu.

Course Description

In this course we will build an understanding of chemistry based on the two core principles of chemistry: that matter is particulate in nature and that the arrangement of these particles governs the properties of matter. We will survey the foundations of modern chemical theories of bonding and reactivity while strengthening quantitative and scientific reasoning skills.

Required Materials

Chemistry: Structure and Properties (Nivaldo Tro, ISBN: 0-134-29393-2)
Modified Mastering Chemistry (Can be bundled with the textbook, but MUST be purchased)
Scientific or graphing calculator (Needed for exams and quizzes)

Content and Structure

Please refer to the attached course schedule for a list of topics covered in class each day. This class will involve class lectures, group problem work, and some class discussion. Preparation for the days class is important so please review the topics to be covered before each class.

Grading

Homework	15%
Quizzes	20%
Exams	45%
Final Exam	20%

Letter grades will be assigned as:

A	93-100	C	69-75
A-	90-92	C-	66-68
B+	87-89	D+	64-65
B	81-86	D	59-63
B-	78-80	D-	54-58
C+	76-77	F	< 54

Homework
Practice is vital to your success in chemistry! To help with this, you will work on some assigned problems from each week; you will find these assignments posted on the course Canvas site. These homework assignments will be completed through Mastering Chemistry software. This is to ensure that you have rapid feedback as you practice your skills. If you have specific questions about homework problems, please come to my office hours. Work that is late or incomplete will be subject to a 1% per day late penalty. There is no cutoff for acceptance of late work. Since the penalty is per day and there is no cutoff to the assignments, extensions will generally not be provided on homework assignments unless there is a documented reason.

Quizzes
Short 15 minute quizzes will be held at regular intervals in the course to help students gauge their preparedness for exams. These quizzes will be based off of homework assignments and will be taken on Canvas. **They are made available every Monday at 8 AM and are due by midnight each week.** I will drop your 3 lowest quizzes. Make-ups are not allowed for quizzes unless there is documented reason.

Exams
There will be 3 exams given during the term. I will announce each exam one week ahead of time, however the date of all of the exams are also available in the course schedule included with this syllabus. Please familiarize yourself with these dates and alert me to any potential conflicts in advance. The exams may consist of multiple choice questions, free response questions, and calculations. **Make-up exams are not permitted unless there is a documented reason.** Missing an exam is not an acceptable reason for requesting a make-up exam. If you anticipate you will miss an exam for an athletic or academic event, you should contact the instructor to schedule a time to take the exam **before** the scheduled exam date.

Final Exam
The same format as the semester exams, except will be cumulative.

Attendance

Please make every effort to attend class regularly. I plan to spend a portion of lecture time working through problems step-by-step, and it is critical that you are there so you can see the steps and ask questions about the material, or the math involved, as they arise.

If you do miss a class (or anticipate missing a class) I always appreciate it if you let me know.

Diversity, Equity, and Inclusion

At Sweet Briar, administrators, faculty, and staff are committed to the creation and maintenance of "inclusive learning" spaces. These are classrooms, labs, and other places of learning where you will be treated with respect and dignity, and where all individuals are provided equitable opportunity to participate, contribute, and succeed.

All students are welcome in this class regardless of race/ethnicity, gender identities, gender expressions, sexual orientation, socio-economic status, age, disabilities, religion, regional background, veteran status, citizenship status, nationality and other diverse identities that we each bring to class.

Learning Difficulties

Sweet Briar College is committed to upholding and maintaining all aspects of the federal Americans with Disabilities Act of 1990 (ADA), as amended in 2008, and Section 504 of the Rehabilitation Act of 1973. If you are a student with a disability and wish to request accommodations, please contact the Office of Accessibility Services accessibility@sbc.edu for an appointment. Because many accommodations require early planning, requests for accommodations should be made as soon as possible.

Academic Integrity

All students are expected to adhere to the guidelines set forth in the SBC honor code, as outlined in the student handbook.

Week of	Monday	Wednesday	Friday
Jan. 9	Course Introduction and Expectations	Essentials: Units, Accuracy and Precision, Significant Figures E.1-E.5	Essentials: Energy, Conversions, Problem Solving E.6-E.9
Jan. 16	Atoms: Matter, Electrons, Atomic Structure 1.1-1.7	Atoms: Subatomic Particles, Average Mass, Moles 1.8-1.10	Quantum Mechanics: Light, Spectroscopy, Bohr Model 2.1-2.3
Jan. 23	Quantum Mechanics: Wave Nature of Matter, Quantum Mechanics and the Atom 2.4-2.5	Quantum Mechanics: The Shapes of Orbitals 2.6	Periodic Properties: Periodic Table, Electron Configuration, Valence Electrons, Elemental Properties 3.1-3.5
Jan. 30	Periodic Properties: Trends in Size and Zeff, Ions, Electon Affinities 3.6-3.8	**Exam 1 (CH E, 1,2, 3)**	Molecules and Compounds: Types of Bonds, Formulas, Lewis Model, Ionic Compounds 4.1-4.6
Feb. 6	Molecules and Compounds: Covalent Bonding, Simple Lewis Structures, Formula Mass, Composition of Compounds 4.7-4.12	Chemical Bonding I: Electronegativity, Polarity, Lewis Structures, Resonance and Formal Charge, Exceptions to Octet Rule 5.1-5.5	Chemical Bonding I: Bond Energies and Lengths, VSEPR Theory 5.6-5.8
Feb. 13	Chemical Bonding I: Predicting Geometries, Molecular Shape and Polarity 5.9-5.10	Chemical Bonding II: Valence Bond Theory 6.1-6.3	Chemical Bonding II: Molecular Orbital Theory 6.4-6.5
Feb. 20	Chemical Reactions and Quantities: Chemical and Physical Changes, Writing and Balancing Equations 7.1-7.3	Chemical Reactions and Quantities: Stoichiometry, Limiting Reagent, Percent Yield 7.4-7.6	Chemical Reactions and Quantities: Examples of Reactions, Practice 7.6
Feb. 27	**Exam 2 (CH 4, 5, 6, 7)**	Solutions and Aqueous Chemistry: Concentration, Solution Stoichiometry 8.1-8.3	Solutions and Aqueous Chemistry: Solubility, Precipitation Reactions, Acid Base Reactions 8.4-8.7
Mar. 6	**Spring Break**	**Spring Break**	**Spring Break**
Mar. 13	Solutions and Aqueous Chemistry: Gas Evolution Reactions, Redox 8.8-8.9	Thermochemistry: Energy, First Law, Heat and Work, ΔE 9.1-9.5	Thermochemistry: Enthalpy, Measuring ΔH, Hess's Law, Lattice Energy 9.6-9.11
Mar. 20	Gases: KMT, Pressure, Simple Gas Laws, Ideal Gas Law 10.7-10.5	Gases: Mixtures of Gases, Dalton's Law, Temperature, Diffusion 10.6-10.9	Gases: Gases in Reactions, Real Gases 10.10-10.11
Mar. 27	Intermolecular Forces: Solids, Liquids, and Gases, Forces, Applications 11.1-11.4	Intermolecular Forces: Vaporization and Vapor Pressure, Sublimation and Fusion, Phase Diagrams 11.5-11.9	**Exam 3 (CH 8, 9, 10, 11)**

Apr. 3	Organic Chemistry Intro: Hydrocarbons, Functional Groups, Intro to Isomerism 21.1-21.5, 21.8	Organic Chemistry Intro: Hydrocarbons, Functional Groups, Intro to Isomerism 21.1-21.5, 21.8	**Final Exam Review**

NOTE: The sections listed for each class period refer to the sections covered in Tro 2nd ed. Confer with the instructor or with another classmate if you are using a different text.