



The mission of Concord University is to provide quality, liberal arts based education, to foster scholarly and creative activities and to serve the regional community (<http://www.concord.edu/academics/>).

Course Prefix, Number and Title: Chemistry 102: General Chemistry II

Course CRN # and Section 20676, Section 03

Course Hours: 3

Prerequisites: MATH 103 and ENGL 101 (co-req. CHEM 112)

Semester Taught (including year): Spring 2019

Room Number (if applicable): Science 400

Course Time (if applicable): Tuesday and Thursday 11:00a-12:15p

Inclement Weather Time: 12:10-1:10p

Instructor: Dr. Alec Wagner, Assistant Professor of Chemistry

Office: Administration Building Room 323

Office Hrs.: Mon. 2-4p, Thurs. 9-10a and 1-4p, Fri. 1-3p Also by appointment

Phone #: 304-384-5988 or x5988 (on campus)

Fax #: 304-384-6225

Email: atwagner@concord.edu

Dep. Web: <http://www.concord.edu/physci/node/2>

Course Description/Rationale:

The course is designed as an introductory to general knowledge of principle of chemistry.

Course Management System: Moodle

Hardware/Software Needed: Microsoft Word, Excel & PowerPoint

Text requirements:

Chemistry: The Molecular Nature of Matter and Change 8th Ed., Martin S. Silberberg and Patricia G. Amateis; McGraw-Hill, Boston, 2017. **Chapters 6 and 12 – 24 will be covered.**

Concord University Educational Goals:

Skills: Proficiency in interpreting data, integrating information, formulating ideas, thinking critically, and communicating with others, as demonstrated by the following competencies:

1. Effective inter-communication skills and literacy adapted as needed for the demands of various kinds of discourse:
 - listening and speaking
 - reading and writing
 - numeracy
 - graphic communication

non-verbal communication
media and technology literacy

Knowledge: Familiarity with principles underlying academic discourse in various fields, as demonstrated by the following capabilities:

An awareness of the fundamental characteristics and properties of the physical universe.

National Standards: American Chemical Society Exam

Specific Learning Outcomes:

This course is a continuation for General Chemistry 101. Students are expected to demonstrate mathematical skills and understanding of fundamental concepts from 101 course. As a result of completing this course sequence, the student should be able to:

- Identify new and current applications for which fundamental chemistry is essential to proper function
- Compare distinct and different elements in the periodic table in order to discuss trends based on their position
- Explain the reactivity of the chemical compounds based on physical property
- Describe the components of atoms and chemical compounds in order to discuss the role of each in reactivity of the compounds
- Analyze intermolecular and intramolecular interactions of the chemical molecules
- Identify chemical bonds and bond strength
- Examine chemical energies of reactions based on theoretical and mathematical models
- Apply qualitative and quantitative analyses for problem solving
- Construct a proper dimensional analysis as a key approach to measurement conversions
- Interpret data based on valid scientific approach
- Apply the principles of atomic and molecular theory, stoichiometry, and thermodynamics
- Justify chemical reactivity in more complex systems based on fundamental chemical concepts
- Utilize proper mathematical models to address chemical equilibrium and kinetics for a chemical reaction
- Characterize properties for intermolecular forces
- Distinguish between kinetics rates for chemical reactions
- Setup balanced redox reactions
- Justify spontaneity of a chemical reaction based on electrochemical properties and thermodynamics
- Predict chemical reactivity based on equilibrium of chemical reactions

Course Requirements

Three types of assignments will appear on the Connect Online Learning website:

- **On-line Homework Assignments:**

Homework Assignments: These assignments are mandatory and will be graded. These problems emphasize calculations. You may attempt each assignment up to ten times before the assignment due date. **THE HIGHEST SCORE RECEIVED FOR EACH ASSIGNMENT WILL BE TAKEN, NOT THE AVERAGE SCORE. THERE IS NO PENALTY FOR ATTEMPTING AN ASSIGNMENT MULTIPLE TIMES. YOU WILL BE LIMITED ON THE NUMBER OF ATTEMPTS. MAKE SURE TO REVIEW THE ASSIGNMENT POLICY BEFORE STARTING.** If you miss 3 out of 10 questions on your first attempt, you only have to work the 3 missed problems on your second attempt – you do NOT have to work all 10 problems again! After the due date for each Connect Assignment, you can access the assignment as a Study Assignment for practice. Your original grade on the assignment does not change. Each online assignment will be available for at least 48 hours unless stated otherwise. Practice problems and review sessions will be announced in advance. Attendance is recommended but optional.

- **Practice Assignments:**

These assignments will NOT be graded. They are similar to the graded Homework Assignments and are available to you for extra practice. In the Practice Assignments, you will see the solutions to the problems, and more practice problems are available to you to work through!

- **LearnSmart Assignments:**

These assignments are mandatory and will be graded. If you complete 100% of the assignment, you will receive a grade of 100; if you complete 80% of the assignment, you will receive a grade of 80, etc. LearnSmart emphasizes concepts more than calculations. During Learnsmart assignments, you can access the electronic textbook to read information that will help you answer each question. LearnSmart assignments are due 24 – 72 hours after the chapter is completed in lecture.

- **Recommended Additional Problems:**

In addition to the problems in the graded on-line homework assignments, other problems from the textbook will be suggested as practice problems. The complete solutions to these suggested practice problems are found in the Student Solutions Manual. You will also find practice worksheets on the Moodle site. The key to success in this class is working large quantities of problems! **NOTE: The ONLY calculator that may be used on tests is the TI-30X IIS by Texas Instruments.**

- **Tests and Quizzes:**

Three tests will be given throughout the semester as listed in the course outline. Review sessions for the tests will be provided a couple of days prior to the test unless stated otherwise. The review sections will be announced in advance. All tests will be administrated on the dates listed below. Any necessary changes will be announced a week in advance. Always come prepared for a 5 – 10 minutes quiz at the beginning of each lecture. The three lowest quizzes will be dropped.

Test 1	February 7	
Test 2	March 7	
Test 3	April 11	
Final Test	May 7	11:00 AM – 1:45 PM

The Final Exam will be assigned during the Finals Week. Students will take the comprehensive standardized test from the American Chemical Society (ACS) for their final which serves as an assessment tool. The exam will cover materials from General Chemistry I and General Chemistry II. All students are required to take the Final ACS Exam.

- **Extra-Credit Poster Session:**

This activity is non-mandatory and it will be credited 3% to the total course grade. You will be required to present a poster on a topic of your choice. Your poster should address the chemistry behind a topic of interest. You will be work with students in your course (3 students/team) and decide on a topic. Your topic should address either a chemical application of a fundamental chemical concept or a community-related chemical problem. For instance, you might want to discuss mercury contamination in Shenandoah Valley. You are to determine the course of the contamination and the chemistry behind it. You will address remedies, applications of chemistry to resolve this problem. You are required to include a minimum of 5 primary literature for references. Your purpose is to demonstrate your understanding of chemistry and share knowledge with your classmates about a topic that intrigues you. The date for the poster presentations will be announced later in the semester. A one-page proposal is to be submitted prior to Spring Break including 5 references. Feedback will be provided to help you prepare your poster.

Grading:

Three in-class tests	30%
Cumulative ACS final exam	15%
On-line Homework	35% (5% LearnSmart and 25% Connect)
In-class participation	5%
<u>Quizzes</u>	<u>5%</u>
Total of	100%

Grading Scale:

90 – 100 %	80 - 89%	70 - 79%	60 – 69 %	Below 60%
A	B	C	D	F

Course Policies:

- **Absence Policy:**

Absences: You must take the tests on the specified dates, unless your absence is excused due to extended illness, emergency, or a university conflict. A request for an

excused absence due to emergency or illness must be made in writing immediately upon your return to class by completing a "Request for Excused Absence Form" available from the professor 24 hours in advance. For an absence due to a University conflict, the request must be made in advance of the test and a note from the coach must be provided. You might be provided the option of dropping the zero received on a missed test by taking a makeup test but that option is not always available. You are highly encouraged to make up all missed quizzes and exams as soon as possible. Inform the instructor of your absence as soon as possible and make arrangements to take the quizzes or the exams within 24 hours. If you fail to adhere to these guidelines, you might not be accommodated based on your excused absence. Generally speaking, only documented University conflicts and severe illness or family emergencies as documented by the Dean of Students will be acceptable excuses for missing a test or exam.

- **Electronic Assignment Submission:**

Homework assignments require on-line submission via Connect. On-line assignments must be completed in a timely fashion. An excuse for "technological difficulties" (internet was down, etc.) is not acceptable. You must click the "SUBMIT" button for each assignment before the due date or the online system will consider it late.

- **Late Assignments:**

Assignments that are not submitted at the specified times will be considered late. There will be a 10% deduction for every day late which will be automatically deducted by the Online Learning Software (Connect).

- **Electronic Device Policy:**

All cell phones must be turned off during lectures. The instructor reserves the right to make point deductions from your grade for using a cell phone during class or dismiss you. You are to conduct yourself professionally and respectfully. You might not be provided a first warning prior to being excused from the lecture. The use of computers should be limited only to taking notes. Any other activities, you will be dismissed immediately from lecture and you will receive 5 points deduction from your participation credits in lecture.

Moodle Policy:

It is your responsibility to refer to Moodle for announcements: reminders of homework assignments due, help sessions, and tests, etc. Refer to the complete policy on: <https://moodle.org/mod/page/view.php?id=8148>

You should also find the following resources on the Moodle

- Copy of our Syllabus
- Connect and LearnSmart On-Line Homework Information
- Outline of Lecture Notes - print out prior to lecture
- Tests and Quizzes (with answers)

- Worksheets – optional extra problems to practice
- Gradebook: Your overall grade will be updated after each exam and it will include all the material you have submitted up to that date.
- **Help Sessions Policy:**
Review and help sessions are offered to the students. An announcement will be made up at least up to 48 hours prior to the review sessions. It is understood that not all students will be able to attend these review sessions. These sessions are designed for additional assistance but students are not required to attend them. Review sessions are administered during the day (times TBD) on weekdays. Students are encouraged to attend office hours if they need assistance and are not able to attend the review sessions. Other help sessions will be announced when available.

Course Timeline:

Timeline and topic coverages are subjected to change as needed. Updates on the course schedule will be provided periodically.

Timeline	Topics	Activity and Resources
Week 1 (January 14 – 18)	Chapter 6 – Thermochemistry: Energy Flow and Chemical Change Thermodynamics and thermochemistry First Law of Thermodynamics (potential and kinetic energies) Work (expansion contraction) Heat (enthalpy, Hess's Law, and heat of formation) Condensation and Calorimetry	Read Chapter Practice extra problems worksheet Complete online assignments
Week 2 (January 21 – January 25)	Chapter 12 – Liquids and Solids Phases of Matter Intermolecular Forces – Dispersion Intermolecular Forces – Dipole – Dipole Intermolecular Forces – Hydrogen Bonds Intermolecular Forces – Ionic Bonds	Read Chapter Practice extra problems worksheet Complete online assignments
Week 3 (January 28 – February 1)	Chapter 13 – The Properties of Mixtures Intermolecular Forces and solubility Intermolecular Forces in Solutions Enthalpies of Solutions Effect of Pressure on Solubility Effect of Temperature on Solubility	Read Chapter Practice extra problems worksheet Complete online assignments
Week 5 (February 11 – February 15)	Chapter 16 – Kinetics: Rates and Mechanisms of Chemical Reactions Reaction Rates Reaction Rates as a Function of Concentration 1 st , 2 nd , 3 rd Orders Rate Expressions Integrated Rate Equations	Read Chapter Practice extra problems worksheet Complete online assignments

Week 6 (February 18 – February 22)	Zero Rate Order Activation Energy and Transition State Temperature Dependence of Rate Arrhenius Equation Reaction Mechanisms (Unimolecular, bimolecular, and Termolecular)	
Week 7 (February 25 – March 1)	Chapter 17 – Equilibrium: The Extent of Chemical Reactions Equilibrium and rates of reactions ICE Box Rate Constant Determination (K) Relationship Between K_p and K_c Solving Equilibrium Problems Le Chatelier's Principle (Concentration, Pressure, Temperature)	Read Chapter Practice extra problems worksheets Complete online assignments
Week 8 (March 4 – March 8) TEST 2 – March 7	Chapter 18 – Acid – Base Equilibria Bronsted – Lowry Acids and Bases Conjugate Acid – Base Pairs Equilibrium Constant Expressions for acid/base	Read Chapter Practice extra problems worksheet
Week 9 (March 11 – March 15) Spring Break	pH, pOH, pK_a , and pK_b re-visited (strong vs. weak) Acid Strength	Complete online assignments
Week 10 (March 18 – March 22)	Monoprotic vs. Polyprotic acids Acid – Base Properties in Salt Solutions	
Week 11 (March 25 – March 29)	Chapter 19 – Ionic Equilibria in Aqueous Systems Buffer Solutions Buffer Calculations Henderson-Hasselbalch Equation Strong Acid – Base Titrations	Read Chapter Practice extra problems worksheet
Week 12 (April 1 – April 5)	Weak Acid – Strong Base Titrations Strong Acid – Weak Base Titrations Acid – Base Indicators Solubility Equilibria Common Ion Effect	Complete online assignments
Week 13 (April 8 – April 12) TEST 3 – April 11	Chapter 20 – Thermodynamics: Entropy, Free Energy, and the Direction of Chemical Reactions Spontaneous and Non-spontaneous Reactions Factors Affecting Spontaneity	Read Chapter Practice extra problems worksheet
Week 14 (April 15 – April 19)	Enthalpy Entropy Second Law of Thermodynamics Gibbs Free Energy Gibbs Free Energy and Equilibrium Constants	Complete online assignments
Week 15 (April 22 – April 26)	Chapter 21 – Electrochemistry, Chemical Change and Electrical Work Oxidation – Reduction reactions Rules for Assigning Oxidation Numbers Balancing Redox Reactions in Neutral, Acidic, and Basic Solutions	Read Chapter Practice extra problems worksheet Complete online assignments

Week 16 (April 29 – May 3)	Electrochemistry vs. Traditional Chemistry Voltaic and Electrolytic Cells Cell Potential and Half – Cell Potentials Nernst Equation Types of Cells Electrolysis
---	--

***Materials from Chapters might be adjusted as needed to cover the majority of the topics and provide proper practice problems for each topic. In case of cancellation of lecture due to weather increments, unplanned events, or required completion of a chapter, video instructions will be uploaded for you to review prior to the next lecture.**

Accessibility/Accommodations:

Concord University is committed to responding to the needs of students with disabilities as defined by the Americans with Disabilities Act. Please inform your instructor at the beginning of the class semester if you have a disability and are requesting accommodations. It is your responsibility to self-disclose that you are requesting accommodations. The University and instructor will provide you with a reasonable accommodation. You should register with CU's Disability Services Office, located in the Athens campus Jerry and Jean Beasley Student Center, Bottom Floor, across from the Campus Post Office. The Disability Services Office phone is 304-384-6086 or you can email the Director, Nancy Ellison, at nellison@concord.edu for assistance.

Academic Dishonesty:

Academic dishonesty is morally unacceptable as well as destructive to the learning and teaching atmosphere. Academic dishonesty includes the giving or receiving of improper help on examinations or assignments, falsifying documents, and plagiarism (the act of stealing and using, as one's own, the ideas or the expression of the ideas of another). Such dishonesty can lead to a variety of penalties — including but not limited to failure of assignment, failure of course, loss of institutional privileges, or dismissal from the University. (See University Catalog Academic Policies and Procedures.)

Concord University Honor Code:

A Concord University Honor Code was approved by students, staff, faculty, administration, and the CU Board of Governors. The Code states:

"As a member of the Concord University Community I will act with honesty and integrity in accordance with our fundamental principles and I will respect myself and others while challenging them to do the same."

The Honor Code is intended to unite the Concord community behind a culture of honesty, integrity, and civility.

Class/Online Attendance Policy:

Regular class attendance is part of a student's academic obligation at Concord. Irregular attendance may affect academic performance adversely and is detrimental to the atmosphere of a class. (See University Catalog Academic Policies and Procedures.)

Emergency Alert System:

In an effort to increase safety and security on our campus, Concord University encourages everyone to register for instant text message alerts. Alerts will only be used for security and safety notices. All students, faculty, and staff are eligible to receive text message alerts on their cell phones or email alerts. Please contact the IT Help Desk for further assistance (304-384-5291).

Emergency Information:

Emergency/courtesy telephones are located at the main entrance of each residence hall and at various other locations on campus. Emergency telephones can be identified by the flashing blue light and will provide the user with a direct link to Public Safety at the press of a button. To report an on-campus emergency, call 304-384-5357 or 911. The Office of Public Safety is located on the bottom floor of the Rahall Technology Center. For further emergency information go to:

<http://www.concord.edu/administration/office-public-safety>.

Inclement Weather Policy:

As a general policy, the University will remain in normal operations during adverse weather conditions. In the event of severe weather conditions, the following may occur:

University Closure

No students or employees are to report.

Classes Cancelled

Students do NOT report BUT employees are expected to report to work at their normal time.

Operating on an Inclement Weather Delay

Under this schedule, all 8 a.m. classes will start at 10 a.m. Students and faculty will follow the Inclement Weather Schedule. (See <http://www.concord.edu/emergency-alerts> for Athens/Beckley Inclement Weather Schedules.)

**Announcements invoking the late schedule or other options referenced above are aired on area radio and television stations and are sent as text and email messages to those enrolled for this service.*

Student Conduct:

In classrooms, online, laboratories, and during any activities that are part of course requirements, students are expected to observe reasonable rules of conduct.

Sexual Harassment & Assault:

Federal law, Title IX, and Concord University policy prohibits discrimination, harassment, and violence based on sex and gender (Including sexual harassment, sexual assault, domestic/dating violence, stalking, sexual exploitation, and retaliation). If you or someone you know has been harassed or assaulted, you can receive confidential counseling support through the Concord University Counseling Center (304-384-5290). Alleged Violations can be reported non-confidentially to the Concord University Title IX Coordinator at 304-384-6327 or titleix@concord.edu. Reports to Campus Security can be made at (304-384-5357). As an employee at Concord University, I am a mandatory reporter which means I must report any sexual misconduct I am made aware of. This includes verbal or written (such as in an assignment) disclosures of sexual harassment or sexual assault.

Technology Services:

Contact the CU Help Desk at extension 5291 from campus or 304-384-5291 off campus. You may also e-mail cuhelpdesk@concord.edu.

Syllabus Disclaimer

"This syllabus is subject to change based on the needs of the class. Please check it regularly. It is your responsibility to remain updated with the materials and announcements made by the instructor during lecture and/or via email."