Chemistry 111 - General Chemistry I - 3 Credit Hours - Fall 2021

Description: Survey of the principles that underlie all chemistry with applications illustrating these principles. **Carolina Core: SCI**

Professor: Dr. Min Zhang
Virtual Office: Blackboard Collaborate Ultra, http://blackboard.sc.edu
Office Hours: By appointment.
Phone: 803 777 6308
E-mail Instructions: **http://www.wikihow.com/Email-a-Professor**
Course Manager: TBD
Instructor E-mail: zhang339@mailbox.sc.edu
GroupMe App: https://groupme.com/join_group/69578888/RC0i5ikd

Time: M/W/F 8:30-9:20AM, Face-to-Face
Places: Face-to-Face: JONES 210
Be prompt. ***Always*** have calculator, iClicker device, and a printed periodic table.

Required Materials:

(eTextbook) Chemistry Principles and Practice by Reger, Goode, and Ball ISBN 9780357693933
(Homework) Achieve Essentials for General Chemistry by Macmillan Learning 2 term access ISBN 9781319404857
(Quizzes) iClicker or REEF Subscription
ISBN: 9781498603041 (stand-alone iClicker preferred)
(Exams) Personal computer compatible with Respondus LockDown Browser with Monitoring for at home examinations. Requires Windows/Mac/iOS with webcam and microphone.

Suggested Materials:

(Class Slides) Lecture Guided Workbook, ISBN 9781938535192

Final Grade: Based on 650 points:

Hour exams 3 @	100 points each
Final exam	200 points
Homework	100 points
Clicker quizzes	50 points

Final Grading Scheme

A	**590 points or higher**
B+	**565-589**
B	**526-564**
C+	**500-525**
C	**440-499**
D	**422-439**
F	**421 and lower**

Course Delivery Options: This is scheduled as a face-to-face course where you are expected to participate in person.

Hour Exams: Common hour exams for all students taking CHEM 111 are given on three designated Friday nights from 6:00-7:15 PM. These exams will be multiple-choice, computer-graded exams. All exams will be based on pools of questions with randomized delivery order, randomized answer order, and with backtracking unavailable. The exams will be taken on your personal computer using **Respondus Lockdown Browser with Monitoring**. On the day of an exam, you are responsible for having a working computer or tablet connected to a stable power source with a stable internet connection, a printed copy of the Exam Reference Sheets, a calculator with fresh batteries, paper, a pencil, and your Carolina Card. Students are expected to establish a proper test taking environment on their own. This includes being in a room free of distractions and free of other individuals both physically and virtually. No additional information or assistance is allowed during exams. Additional devices are prohibited, for example other computers, cell phones, or smart watches. Also prohibited are earphones and clothing that obscure the ears. **No make-up exams will be given.** If an exam is missed for a valid reason it is the responsibility of the student to supply the instructor with a valid excuse (doctor's statement, etc.) promptly after the missed exam. One-half of the Final Exam score (200pt basis) will be substituted for one missing or lower scoring Hour Exam (100pt basis). Only one such substitution is allowed.

Download and install the Respondus Lockdown Browser:
https://download.respondus.com/lockdown/download.php?id=943743695
The Respondus Monitoring will require that you have a functioning webcam and microphone.

For technical assistance, go to the Respondus Technical Support page at https://web.respondus.com/support/

FINAL EXAM: The rules for hour exams apply, the test is comprehensive, cannot be exempted, and is scheduled for **Friday December 10th from 7:30-10:00 PM** via **Respondus Lockdown Browser with Monitoring.** This is the common exam time for all CHEM 111 sections and is different from that listed by the Registrar.

Macmillan Achieve Online Homework: A computerized homework program will be used for homework. Chemistry problems will be assigned for each chapter for each student to solve. The answers will be submitted via the internet with immediate feedback. Problems may be attempted multiple times within the available time frame with progressively decreasing partial credit. You must have a MacMillan Achieve account, which can be purchased from the bookstore. Your Achieve account must be associated with your university email address, not a

personal email address. This system is online and **should be accessed from the link on Blackboard.**

The following link includes more detailed instructions on how to register for your course:
https://macmillan.force.com/macmillanlearning/s/article/Students-Register-for-Achieve-courses-via-your-school-s-LMS?r=36&ui-knowledge-components-aura-actions.KnowledgeArticleVersionCreateDraftFromOnlineAction.createDraftFromOnlineArticle=1#blackboard .

Achieve may be used for free with a grace period before payment:
https://macmillan.force.com/macmillanlearning/s/article/Achieve-Convert-free-trial-access-to-full-access?r=36&ui-knowledge-components-aura-actions.KnowledgeArticleVersionCreateDraftFromOnlineAction.createDraftFromOnlineArticle=1 .

For more information on Achieve or for any technical issues please go to https://macmillan.force.com/macmillanlearning/s/achieve . USC does not have administration access to Achieve. **Please do not e-mail instructor!**

Homework due dates: Homework, either special Blackboard assignments or Achieve problems will generally be due by 5:55 A.M. (Eastern Standard Time) every Monday morning. Additional problems may be added after each class. Extensions will not be granted unless the homework system fails.

Laboratory: Chemistry 111L is a co-requisite for this course**.**

Student Success Center: In partnership with University of South Carolina faculty, the Student Success Center (SSC) offers a number of programs to assist you in better understanding your course material and to aid you on your path to success. SSC programs are facilitated by trained undergraduate peer leaders who have previously excelled in their courses. Resources available to students in this course include:

- *Peer Tutoring:* You can make a one-on-one appointment with a peer tutor by going to www.sc.edu/success. Drop-in tutoring and online tutoring may also be available for this course. Visit our website for a full schedule of times, locations, and courses.
- *Supplemental Instruction (SI)***:** SI Leaders are assigned to specific sections of courses and hold three weekly study sessions. Sessions focus on the most difficult content being covered in class. The SI Session schedule is posted through the SSC website each week and will also be communicated in class by the SI Leader. Your SI Leader is Paige Beans (pbeans@email.sc.edu).

- *Success Connect***:** Throughout the semester, your instructor may communicate with the SSC regarding your progress in the course. If contacted by the SSC, please

schedule an appointment to discuss campus resources that are available to you. Success Connect referrals are not punitive and any information shared by your professor is confidential and subject to FERPA regulations. SSC services are offered to all UofSC undergraduates at no additional cost. You are invited to call the Student Success Hotline at (803) 777-1000 or visit www.sc.edu/success to check schedules and make appointments. Success Consultants are available to assist you in navigating the University and connecting to available resources.

Disability Services: Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, contact the Student Disability Resource Center: 803-777-6142, TDD 803-777-6744, email sasds@mailbox.sc.edu, or stop by Close-Hipp Suite 102. All accommodations must be approved through the Student Disability Resource Center.

Prerequisite: In order to be eligible to take CHEM 111, you must have received a passing grade or exempted MATH 111, 115 or higher.

Cell Phones, Computers, Tablets: Ringing or answering cell phones, **including text messaging**, has been defined by the College as "disruptive behavior" and must be avoided during class. **Phones and Tablets** may be used in lecture for **note-taking and iClicker responses only** and must remain flat on the desk the entire class to avoid distracting other students. Laptops may be used in class for iClicker responses only. Laptops may not be used continuously since the upright screen distracts those behind you. Misuse of devices will be monitored.

Attendance: Attendance is *required* for this class. Attendance is defined as being present for the entire class using the registered face-to-face format. Roll will be taken. More than four absences from class will lower your final grade one half grade. More than six absences will lower your grade one full grade. More than ten absences will result in the grade of F. Arriving late and/or leaving early are recorded as a missed class.
Students must attend all classes in the format they are offered (For example, students are expected to attend in-person classes in person). Students who miss classes due to COVID quarantine, a diagnosed health condition or registered disability should contact the Undergraduate Student Ombudsman or Student Disability Resource Services to document the reason for their absence. Students with documented absences *may be offered* recorded classes, be considered present for participating in class virtually and have the opportunity to reschedule exams, labs or assignments at the instructor's discretion; first utilizing any syllabus statement regarding missed class, assignments or exams. If a student misses more than one exam with proper official documentation then the second missed exam may be rescheduled. **ALL excused absences and accommodations for disabilities MUST have proper official documentation.**

Hazardous Weather and Emergency Class Cancellations
If the University of South Carolina is closed for reasons stated in policy HR 1.18, students will be excused from class. In the case of an emergency closure, e.g. COVID19 related, the university may require that this course move to be fully online synchronous with little notice.

Copyright: All materials from this class are copyrighted. They may not be publicly posted or transferred to third parties. Please contact the instructor if you wish to record the lectures.

iCLICKER Quizzes:
An iClicker v1/v2/REEF subscription is required for participation in this course. You may purchase a device/subscription through the bookstore. **Your iClicker account must be associated with your university email address**, not a personal email address. iClicker scores are available within a few hours after each class via iClicker.com

iClicker registration:
Please register your account with this Course on the REEF website: https://www.iclicker.com (CHEM111- Fall 2021-(011, Q11)-Dr. Zhang)
It is your responsibility to make sure your account is registered properly with this section: "CHEM111- Fall 2021-(011, Q11)-Dr. Zhang"
iClicker technical support is available from: https://macmillan.force.com/iclicker/s/

iCLICKER Policies
Cheating policy:
Submitting/receiving iClicker responses for/from other students is cheating and a violation of the University Honor Code. If you are caught accessing a subscription other than your own or have votes in a class that you did not attend, you will face disciplinary action.
Forgotten iClicker:
Please realize that we will be using iClicker in almost every class and will correspond to 50 points of your final grade. It is your responsibility to be prepared to participate with a functioning iClicker device every day.
Broken/lost clicker policy:
If you have lost or broken your iClicker device, then use the same REEF login credentials on a different device.

Hygiene: Face coverings protect you and your classmates in case the wearer is unknowingly infected but does not have symptoms. Faculty, students and staff are strongly recommended to wear an appropriate face covering in all classrooms and in other designated areas on campus. Face coverings should cover your nose and mouth in a community setting.

Important Links:

Proper use, removal, and washing of cloth face coverings
CDC Recommendation Regarding the Use of Face Coverings

Academic Responsibility: The University of South Carolina has a strict code covering bribery, cheating, lying, plagiarism, and misuse of a telephone information processing system. Any violation of this code can result in severe penalties including probation, suspension, or expulsion. Infractions will not be tolerated. All required elements of the course are to be completed within the normal term. Failure to complete all the elements on time will result in a grade of F. Incompletes will only be assigned in unusual circumstances.

Technical Abilities: This course uses multiple digital platforms, including iClicker, Achieve, Blackboard, Respondus Lockdown Browser with monitoring, and several sources or recorded audio and video content. Students are expected to have sufficient basic computer skills to use each of these services.

LEARNING OUTCOMES After completing CHEM 111, students will be able to:

• Define and employ chemical language and symbolism (Carolina Core Scientific Literacy (CCSL) CCSL LO2).
• Summarize the important scientific discoveries that led to the development of modern chemistry (CCSL LO3).
• Recognize that the natural world has an atomic and molecular basis which successfully explains its physical phenomena (CCSL LO2).
• Explain the fundamental principles of molecular structure and shape (CCSL LO2).
• Use dimensional analysis with proper attention to units and significant figures, and name and classify inorganic compounds (CCSL LO1).
• Balance chemical equations and use stoichiometric relationships and the mole concept to calculate product and reactant amounts (CCSL LO1, LO2).
• Identify different types of reactions (precipitation, neutralization, and oxidation-reduction) and predict the outcome of these reactions (CCSL LO1, LO2).
• Explain the first law of thermodynamics and the role of energy and enthalpy in chemical reactions and perform thermochemical calculations (CCSL LO1, LO2).
• Explain the basic concepts of quantum theory, determine the electron configurations of atoms, and use periodic trends to make predictions about atomic properties (CCSL LO1, LO2).
• Explain theories of chemical bonding and determine the molecular geometry of molecules using VSEPR theory (CCSL LO1, LO2).
• Apply gas laws and kinetic molecular theory to processes involving gases.
• Explain the intermolecular attractive forces that determine the properties of the states of matter and phase behavior (CCSL LO1).
• Explain colligative properties and their use in determining the characteristic of solutions (CCSL LO1).

• Discuss the importance of chemistry in our everyday lives and the financial realities of a global economy (CCSL LO3).
• Discuss, through examples, the impact of chemical phenomena on the fields of medicine, pharmacy, dentistry, biology, and physics (CCSL LO3).
• Explain the fundamentals of acid-base chemistry (CCSL LO2).

ASSIGNMENTS/METHODS OF ASSESSING OUTCOMES:
The expected learning outcomes will be assessed through the use of homework assignments, quizzes, exams, and the final exam.
EXAM I: Students will employ the terminology of the study of Chemistry and will demonstrate an understanding of matter, measurements and uncertainty, Dalton's Atomic Theory, atomic composition, masses, and structure, the periodic table, chemical nomenclature and historical experiments as related to modern day. The students will demonstrate an understanding of chemical equations and formulas, mole and molar mass, molarity, stoichiometry and limiting reactants
EXAM II: As an extension of the material from exam I, the students will demonstrate an understanding of enthalpy and thermochemical equations, calorimetry and Hess's Law, properties and measurements of gases, the gas laws including the ideal gas law, Dalton's law of partial pressure, the kinetic molecular theory of gases and any current societal impact discussed related to these topics. The students will demonstrate an understanding of the nature of light, matter as waves, quantum numbers and energy levels for multielectron atoms, electron configurations and the periodic table trends
EXAM III: As an extension of the material from exam I and II, the students will demonstrate an understanding of Lewis symbols, bonding, resonance structures, bond energies, shapes of molecules and polarity of molecules.
FINAL EXAM: Students will demonstrate an understanding of the material from exams I, II, and III, in addition phase changes and phase diagrams, intermolecular attractions, and the properties and structures of crystalline solids.
ONLINE HOMEWORK: Students will demonstrate critical thinking and problem solving through the homework assignments. The assignments are based on the text book and follow the chapter progression according to the lecture schedule.
QUIZZES: There will be a clicker quiz every class period. These quizzes will be part of the attendance record as well as an evaluation tool. You must have a device with iClicker v1/v2/REEF device to take the quizzes.

Student-Student Communication: Students may communicate with each other using a Blackboard discussion board.

Chemistry 111
Fall 2021
Exam and Tentative Lecture Schedule, MWF class

#	DAY	DATE	TOPICS
1	F	8-20	Intro., Ch 1 (1.2, 1.3 : matter, uncertainty in calculations)
2	M	8-23	Ch 1,2 (1.4, 2.1, 2.2: conversion factors, atomic theory)
3	W	8-25	Ch 2 (2.3, 2.4, 2.5: atoms, ions, atomic mass, periodic table)
4	F	8-27	Ch 2 (2.6, 2.7: molecular mass, ionic compounds)
5	M	8-30	Ch 2,3 (2.9, 3.1: nomenclature, chemical equations,)
6	W	9-1	Ch 3 (3.2, 3.3: mole, chemical formulas)
7	F	9-3	Ch 3 (3.4, 3.5: equation mass relationships)
	M	9-6	No Class – Labor Day
8	W	9-8	Ch 3,4 (3.5, 4.1, 4.2: limiting reactant, solubility)
9	F	9-10	Ch 4 (4.2, 4.3:, molarity, dilution)
10	M	9-13	Ch 4 (4.3, 4.4: solution equation stoichiometry, chemical analysis)
11	W	9-15	Review Exam 1
12	F	9-17	Ch 5 (5.1 - 5.2: heat, enthalpy in equations)
	F	9-17	**Exam I (chapters 1 - 4) 6:00-7:15 PM remote examination**
13	M	9-20	Ch 5 (5.2: enthalpy in equations)
14	W	9-22	Ch 5 (5.3, 5:4: calorimetry, Hess's law)
15	F	9-24	Ch 5 (5.5: heats of formation)
16	M	9-27	Ch 6 (6.1 - 6.3: gases, simple gas laws, ideal gas law,)
17	W	9-29	Ch 6 (6.4 - 6.5: gas stoichiometry, partial pressures,)
18	F	10-1	Ch 6 (6.6- 6.8: kinetic molecular theory, diffusion/effusion)
19	M	10-4	Ch 7 (7.1 - 7.4: light, line spectra, quantum numbers)
20	W	10-6	Ch 7 (7.4 - 7.5: quantum numbers, energy levels in atoms)
	F	10-8	No Class – Fall Break
21	M	10-11	Ch 7,8 (7.6 - 8.1: multielectron atoms, electron configurations)
22	W	10-13	Ch 8 (8.2, 8.3: energy levels in atoms and ions, size)
23	F	10-15	Ch 8 (8.4- 8.5: ionization energy trends, electron affinity)
24	M	10-18	Ch 9 (9.1, 9.2: Lewis symbols, ionic bonding)
25	W	10-20	Ch 9 (9.2, 9.3: ionic bonding, covalent bonding,)
26	F	10-22	Review Exam II
	F	10-22	**Exam II (chapters 5 – 8.1) 6:00-7:15 PM remote examination**
27	M	10-25	Ch 9 (9.3: Lewis structures)
28	W	10-27	Ch 9 (9.3, 9.4: Lewis structures, electronegativity)
29	F	10-29	Ch 9 (9.5 - 9.6: formal charge, resonance)
30	M	11-1	Ch 9 (9.7 - 9.8: exceptions to the octet rule, bond energies)
31	W	11-3	Ch 10 (10.1,10.2: VSEPR, polarity of molecules)
32	F	11-5	Ch 10 (10.2, 10.3: polarity of molecules, hybrid orbitals)
33	M	11-8	Ch 10 (10.3, 10.4: hybrid orbitals, multiple bonds)
34	W	11-10	Ch 10 (10.4, 10.5: multiple bonds, molecular orbitals)
35	F	11-12	Ch 10 (10.6: molecular orbitals)
36	M	11-15	Ch 10 (10.6: molecular orbitals of second row diatomics)
37	W	11-17	Ch 11 (11.1 - 11.2: phases of matter)

38	F	11-19	Review Exam III
	F	11-19	**Exam III (chapters 8.2 - 10) 6:00-7:15 PM remote examination**
39	M	11-22	Ch 11 (11.3, 11.4: phase diagrams, intermolecular forces)
	W	11-24	No Class – Thanksgiving Break
	F	11-26	No Class – Thanksgiving Break
40	M	11-29	Ch 11 (11.4 - 11.5: intermolecular forces, liquids)
41	W	12-1	Ch 11(11.6: solids)
42	F	12-3	Review for Final Exam

Final Exam Friday, December 10th, 7:30-10:00 pm remote examination.

Chemistry 111

Additional Homework Assignments

Chapter 1: 1.53, 1.91, 1.103

Chapter 2: 2.33, 2.39, 2.61, 2.73, 2.87, 2.97, 2.115

Chapter 3: 3.21, 3.33, 3.37, 3.63, 3.69, 3.83, 3.97, 3.115, 3.119, 3.123, 3.131, 3.137

Chapter 4: 4.17, 4.21, 4.33, 4.45, 4.67, 4.71, 4.77, 4.87, 4.99

Chapter 5: 5.35, 5.41, 5.53, 5.67, 5.81

Chapter 6: 6.25, 6.29, 6.37, 6.51, 6.59, 6.69, 6.79, 6.97

Chapter 7: 7.53, 7.71, 7.77, 7.79, 7.85

Chapter 8: 8.25, 8.29, 8.33, 8.43, 8.93, 8.47, 8.49, 8.57, 8.63, 8.73, 8.95

Chapter 9: 9.23, 9.31, 9.35, 9.37, 9.43abd, 9.53, 9.57ab, 9.73, 9.105, 9.89

Chapter 10: 10.25, 10.29, 10.35, 10.49, 10.55, 10.57, 10.69, 10.73, 10.73, 10.85, 10.89

Chapter 11: 11.27, 11.43, 11.51, 11.59