

Fayetteville State University
College of Arts and Sciences
Department of Natural Sciences
CHEM140-01 and General Chemistry I
Fall Semester/Year 2008

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I. Locator Information:

Instructor: Shubo Han, PhD

Course # and Name: CHEM140-01

Office Location: Lyons 326

Semester Credit Hours: 4

Office hours: MWF 10:00am-12:00pm

T 10:00am-12:00 pm

Day and Time Class Meets: Lecture: MWF 9:00 am-9:50 am

Lab: M 2:00pm -4:50 pm

Office Phone: 910-6721303

Total Contact Hours for Class: 6

Email address: shan@uncfsu.edu

The following statement should appear on the first page of each course syllabus:

FSU Policy on Electronic Mail: Fayetteville State University provides to each student, free of charge, an electronic mail account (username@uncfsu.edu) that is easily accessible via the Internet. The university has established FSU email as the primary mode of correspondence between university officials and enrolled students. Inquiries and requests from students pertaining to academic records, grades, bills, financial aid, and other matters of a confidential nature must be submitted via FSU email. Inquiries or requests from personal email accounts are not assured a response. The university maintains open-use computer laboratories throughout the campus that can be used to access electronic mail.

Rules and regulations governing the use of FSU email may be found at

<http://www.uncfsu.edu/PDFs/EmailPolicyFinal.pdf>

II. Course Description:

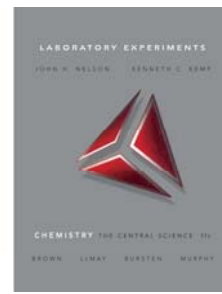
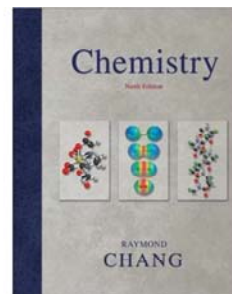
CHEM 140 (4-3-3), General Chemistry I, is a course about atomic theory, bonding, molecular structure and geometry, stoichiometry, thermochemistry and the three states of matter, with laboratory activities investigating mole-mass relationships, gas laws, and measurement of thermochemical phenomena. *Prerequisites: MATH 123 or 129.*

III. Disabled Student Services: In accordance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act (ACA) of 1990, if you have a disability or think you have a disability to please contact the Center for Personal Development in the Spaulding Building, Room 155 (1st Floor); 910-672-1203.

IV. Textbook:

Lecture: Raymond Chang. Chemistry, 10/E Mc Graw Hill, ISBN 978-0-07-727431-3.

Lab: John H Nelson, Kenneth C Kemp. 2007. **Chemistry the Central Science, Laboratory Experiments, 10/E**, Prentice Hall, ISBN-10: 0131464795, **2006**.



ARIS for online study and homework: aris.mhhe.com (code: 83D-6C-A87)

V. Student Learning Outcomes:

This course is designed to fulfill the following FSU core student outcomes:¹

FSU outcome #	FSU core student outcome. Students will...	Assessment method in this class
2a.02	Reasoning skills–critical thinking: Identify correctly the conclusion and supporting reasons and evidence in written and oral passages	Laboratory reports, problem-solving homework, examinations
2b.01	Reasoning skills–quantitative literacy: Correctly calculate, interpret, and assess statistical data and concepts, including data presented in graphs, charts, or tables, in various forms of documents and discourse	Laboratory reports that require the students to tabulate findings; Homework.
4.01	Scientific literacy: Recognize the role of observation and experimentation in the development of scientific theories	Laboratory reports
4.03	Scientific literacy: Interpret and express the results of observation and experimentation.	Laboratory reports
4.04	Scientific literacy: Understand the fundamental concepts of one natural science.	Examinations
4.07	Scientific literacy: Understand the role of science and technology in everyday life.	Labs on Chemistry of Everyday life

This course addresses the following NCATE and DPI standards:

Standards Used in this Course	NCDPI Specialty Area Standards	NCATE Standard(s) (NSTA)	Assessment(s)
1	Science teachers understand the unifying concepts of science.	1 a, b	Examinations
2	Science teachers understand the nature of science and the development of scientific thought.	2 c	Laboratory reports, homework
3	Science teachers understand the historical development of scientific thought and the application of science in society.	2 b	Laboratory reports
4	Science teachers understand the math concepts and processes and the technologies that are used in science.	1 e	Laboratory reports that require the students to tabulate findings; problem-solving homework
14	Science teachers understand safety and liability issues in science and advocate for appropriate safety materials and enforcement practices in the classroom.	9 b, c	Students write their own safety plan as part of the pre-lab requirements

From this, students should gain knowledge of the concepts of chemistry and an understanding of how these concepts connect with everyday life. Through study of these

¹ The FSU core student outcomes are in a document that was derived from the Six Core Review Task Force Reports and

- Submitted by the Editorial Reconciliation Committee, Spring 2007
- Approved by the University College Advisory Board, April 3, 2007
- Approved by the Faculty Senate, November 15, 2007
- Approved by Provost and Chancellor, December 2007

topics, hands-on experience in the laboratory, and practice in written communication, the chemical mode of thinking that is central to so many sciences will become more familiar. Students will gain preparation for careers in not only chemistry itself, but in biology, engineering, and health-related fields.

The following topics will be emphasized in this class:

1. Classifications of matter (elements, compounds, mixtures)
2. Physical and chemical properties
3. Measurement
The SI system of measurement
Converting between different units
Expressing precision appropriately
4. Intensive and extensive physical quantities
5. The structure of the atom
6. Basics of the periodic table
7. Chemical formulas:
Ionic compounds
Molecular compounds
Acids
8. Stoichiometry topics:
Atomic and molecular mass
The mole concept
Percent composition
Empirical formulas (including experimental determination)
Balancing chemical equations
Limiting reagent and percent yield
9. Strong and weak electrolytes
10. Solubility rules
11. Precipitation reactions
Molecular
Complete ionic
Net ionic
12. Acid–base reactions
13. Oxidation–reduction reactions
Half-reactions
Oxidation state
Activity series of metals
14. Concentration and serial dilution
15. Titration calculations
16. Gases
Physical definition and units of pressure
Gas laws (Boyle's, Charles's, Avogadro's)
Ideal gas equation
Density and molar mass
Gas stoichiometry
17. Thermochemistry
Types of energy relevant in chemistry

State functions
 Heat and work
 Enthalpy of reactions
 Constant-pressure calorimetry
 Enthalpy of formation
 Hess's law

18. Electromagnetic radiation
 - Properties of waves
 - Introduction to quantum theory
 - Emission spectra and Bohr's model
 - The De Broglie equation
19. Theoretical basis of the periodic table
 - Quantum numbers
 - Atomic orbitals
 - Electron configuration (neutral atoms and ions, including transition metals)
 - Magnetism
 - The aufbau principle
20. Details of the periodic table
 - Historical development
 - Names and properties of important groups
 - Periodic trends (atomic and ionic radii, ionization energy, electron affinity)
21. Chemical bonding
 - Electronegativity
 - Lewis-dot structures
 - Resonance
 - Expanded octets
22. Molecular geometry and hybridization

VI. Course Requirements and Evaluation

- a. *Grading Scale:* Final grades are calculated on a four-point system and affect a student's grade point average as indicated below.

Grade	Credit Hours	Quality Points	Meaning
A	Hours attempted and earned	4 per credit hour;	Exceptionally high
B	Hours attempted and earned	3 per credit hour	Good
C	Hours attempted and earned	2 per credit hour	Satisfactory
D	Hours attempted and earned	1 per credit hour	Marginally passing
F	Hours attempted – Not earned	0 per credit hour	Failing
FN	Hours attempted – Not earned	0 per credit hour	Failing due to non-attendance. (Student registered, but <u>never</u> attended.)
W	Hours attempted – Not earned	No impact on GPA	Class withdrawal prior to deadline (see Academic Calendar)
P	Hours attempted and earned	No impact on GPA	Satisfactory - Assigned only in classes specified as Pass/Fail
WU	Hours attempted – Not earned	No impact on GPA	Withdrawal from all classes for semester or term
AU	Hours attempted – Not earned	No impact on GPA	Auditing

The final grade assigned to the student will be based upon the following numerical equivalencies:

A = 90%-100%
 B = 80%-89.9%

- C = 70%-79.9%
- D = 60%-69.9%
- F = 59.9% or less (Failure)

b. Attendance Requirements – Students are expected to attend all lecture and laboratory sessions, except in cases of illness and other unforeseen emergencies. Attendance will be taken promptly at the beginning of each session. Any student coming in after the roll has been called will have been marked absence. It is the student's responsibility to see that all tardies have been duly noted. Students will also be charged with a tardy for departure from the class before the specified end of class. The accumulation of three (3) tardies will result in the student being charged with one (1) absence. It is the student's responsibility to contact the instructor about the steps that must be taken for making up any and all missed work. It is recommended that contact with the instructor take place within twenty-four (24) hours of having missed class. The university policy concerning absences from class will be strictly enforced.

i. INTERIM GRADE X = NO SHOW – Assigned to students who are on a class roster, but never attend class. For warning purposes only; NOT a final grade.

STUDENTS: Check interim grades early in the semester. If you have an X grade, either begin attending the class or withdraw from it. If you do not take action in response to an X grade, you will receive a final grade of FN.

➤ **INTERIM GRADE EA = EXCESSIVE ABSENCES** - Assigned to students whose class absences exceed 10% of the total contact hours. For warning purposes only, NOT a final grade.

STUDENTS: Check your interim grades often. If you have an “EA” grade for a class, you are in jeopardy of failure if you do not take immediate actions. Either resume attending the class or withdraw from it.

➤ **FN = FAILURE DUE TO NON-ATTENDANCE** – Assigned to students who are on class roster, but never attend the class. An FN grades is equivalent to an F grade in the calculation of the GPA.

STUDENTS: You must attend (or withdraw from) all the classes for which you are enrolled.

c. Graded Assignments and the Value of Each Assignment

The progress of each student will be evaluated by means of three one-hour examinations given during the semester, laboratory reports, homework in each chapter, quizzes, and a final examination.

Grade distribution	<i>Percentage represented in the Final Grade</i>
<i>Three hour exams</i>	25%
<i>Laboratory reports</i>	20%
<i>Homework and quizzes</i>	30%
Final examination	25%
Total	100%

d. Policy on Missed or Late Assignments

You are expected to take all examinations at the scheduled times. No student will be allowed to take an exam before or following the scheduled exam time. Should an illness, family emergency, official university-sanctioned event or other unavoidable problem necessitate your missing a scheduled exam, you may take a make-up exam provided that (1) the instructor is notified prior to the exam, and (2) you show verifiable evidence for the condition/situation/event that resulted in your missing the regularly scheduled exam. The latter may be in the form of a note from a doctor or the university's student health clinic in the event of serious illness, a note from another Fayetteville State faculty or the athletic department indicating your involvement in an official university-sanctioned event, a bulletin from a funeral service, a note from an employer, etc. In all cases, contact information, i.e., a phone number, must be included. The make-up exam will be administered at a time agreed upon by both the student and the instructor. Note that makeup exams may be longer, more difficult, and have a different format than the exam given to the class as a whole.

Late submissions of homework and lab reports are penalized 30% of whole points. Missed submissions of homework and lab reports are received 0 points for that assignment.

e. Other

To accommodate emergent circumstances, the professor reserves the right to make reasonable changes in the syllabus while the course is in progress. Any understandings between a student and the professor including, but not limited to, changes, expectations, or modifications to course requirements or procedures must be in writing and must be signed by both parties. Any question of interpretation of course requirements or of understandings between a student and the professor will be at the discretion of the professor.

FSU Policy on Disruptive Behavior in the Classroom

The *Code of the University of North Carolina* (of which FSU is a constituent institution) and the *FSU Code of Student Conduct* affirm that all students have the right to receive instruction without interference from other students who disrupt classes.

FSU Core Curriculum Learning Outcome under Ethics and Civic Engagement (6.03): All students will “prepare themselves for responsible citizenship by fulfilling roles and responsibilities associated with membership in various organizations.” Each classroom is a mini-community. Students learn and demonstrate responsible citizenship by abiding by the rules of classroom behavior and respecting the rights all members of the class.

The FSU Policy on Disruptive Behavior (see FSU website for complete policy) identifies the following behaviors as disruptive:

1. Failure to respect the rights of other students to express their viewpoints by behaviors such as repeatedly interrupting others while they speak, using profanity and/or disrespectful names or labels for others, ridiculing others for their viewpoints, and other similar behaviors;
2. Excessive talking to other students while the faculty member or other students are presenting information or expressing their viewpoints.
3. Use of cell phones and other electronic devices
4. Overt inattentiveness (sleeping, reading newspapers)
5. Eating in class (except as permitted by the faculty member)
6. Threats or statements that jeopardize the safety of the student and others
7. Failure to follow reasonable requests of faculty members
8. Entering class late or leaving class early on regular basis
9. Others as specified by the instructor.

The instructor may take the following actions in response to disruptive behavior. Students should recognize that refusing to comply with reasonable requests from the faculty member is another incidence of disruptive behavior.

1. Direct student to cease disruptive behavior.
2. Direct student to change seating locations.
3. Require student to have individual conference with faculty member. At his meeting the faculty member will explain the consequences of continued disruptive behavior.
4. Dismiss class for the remainder of the period. (Must be reported to department chair.)
5. Lower the student’s final exam by a maximum of one-letter grade.
6. File a complaint with the Dean of Students for more severe disciplinary action.

Students who believe the faculty member has unfairly applied the policy to them may make an appeal with the faculty member’s department chair.

VII. Academic Support Resources

Blackboard: <http://blackboard.uncfsu.edu/>

Smarthinking Student Site: <http://www.smarthinking.com/>

American Chemical Society Site: <http://www.chemistry.org/portal/a/c/s/1/educatorsandstudents.html>

VIII. Course Outline and Assignment Schedule

- a. Lecture and examination schedule:

Week	Chapter	Topic
Aug.21	1	Chemistry: The Study of Change
Aug.24	1, 2	Chemistry: The Study of Change; Atoms, Molecules, and Ions.
Sept.1	2	Atoms, Molecules, and Ions.
Sept. 9	3	Exam 1; Mass Relationships in Chemical Reactions.
Sept.14	3	Mass Relationships in Chemical Reactions
Sept.21	4	Reactions in Aqueous Solutions
Sept.28	4	Reactions in Aqueous Solutions
Oct.5	Midterm Exam	Midterm Exam (Exam2)
Oct.12	Fall Break	Fall Break
Oct. 19	6	Thermochemistry
Oct. 26	6	Quantum Theory and the Electronic Structure of Atoms
Nov.2	7	Quantum Theory and the Electronic Structure of Atoms; Exam 3
Nov.9	7	Periodic Relationships among the Elements
Nov.16	8	Periodic Relationships among the Elements
Nov. 23	9	Chemical Bonding I
Nov. 30	10	Chemical Bonding II
Dec. 7	Final Exam	

b. Lab Schedule

WEEK OF	Page Number	Experiment Title
Aug 24 ^h	p. xxxvii	Check In/Safety Briefing Laboratory Safety and Work Instructions
Sept 1st <i>(Labor Day Holiday)</i>	p. 1 – 16 <i>(No Classes)</i>	Basic Laboratory Techniques
Sept 8 th	p. 17 - 28	Identification of Substances by Physical Properties
Sept 14 th	p. 47 - 58	Chemical Formulas.
Sept 21 nd	p. 37 - 46	Chemical Reactions !
Sept 28 th	No Labs	Problem Solving Session -Midterm exams
Oct 5 th	p. 59 - 66	Chemical Reactions of Copper and Percent Yield.
Oct 12 th	Hand Out	Water of Hydration.
Oct 19 th	p. 67 - 76	Chemicals in Everyday Life: What are they and how do we know?
Oct 26 th	p. 137 -148	Behavior of Gases: Molar Mass of a Vapor (Part B, p. 88).
Nov 2 rd	Hand Out	Quantitative solution Preparation (Molarity).
Nov 9 th		Line Spectra Demo
Nov 16 th	p. 107 - 122	Molecular Geometries of Covalent Molecules: Lewis Structures and the VSPR Model.
Nov 28th		Check Out and Problem Solving Session
Dec. 8th - 12th		Final Exams

Laboratory Manager:

Ivy Rittenhouse
LS 305
Ext. 1054
irittenhouse@uncfsu.edu

Pre-lab questions are due at the beginning of the lab session. **Post-lab questions** are to be answered and to be included within your laboratory report.

Laboratory reports will be typed. For the first lab report, write out what you did in your own words (the Experimental section) and tabulate and comment on the results (Results and Discussion). Additional parts on subsequent reports will be explained later.

In the event that a particular laboratory session is cancelled due to inclement weather, etc., the schedule will resume starting with the laboratory experiment that was missed.

IX. Teaching Strategies

There will be lecture and laboratory sessions. A variety of formats will be used in this class. Typically, the class will begin with answering your questions about the homework or a ten-minute quiz, then new material in a lecture format and then in-class exercises, with discussion in an interactive format.

- a. **Hour exams** are in the short-essay format. Questions may consist of either a numerical problem to work out or a concept to explain in a few sentences. To receive full credit for numerical problems, make sure your thought process is written out clearly.
- b. **Laboratory reports.** The laboratory is an important component of the course. Each laboratory experiment has three components.

Pre-lab: Read the procedure beforehand. Write it out in your own words, and bring that procedure to lab, not your textbook. Write out the procedure as step-by-step instructions and make a list of equipment and chemicals at the top, with the hazards associated with each of the chemicals.

In lab: Use your laboratory notebook to record what you have done, not what you plan to do. Record raw data *directly* into the notebook as you observe them; do not write weighings or buret readings on separate pieces of paper to be transcribed later into the notebook.

Laboratory report: This is to have a title, author(s), abstract, introduction, experimental, results and discussion, and reference(s). Laboratory reports will be typed. For the first lab report, write out what you did in your own words (the Experimental section) and tabulate and comment on the results (Results and Discussion). Additional parts on subsequent reports will be explained later.

- c. You will be trained in the use of Microsoft Excel and will be expected to use it for calculations.

X. Bibliography

- a. Brown, LeMay, and Bursten, Chemistry-The Central Science, 10th edition: Prentice Hall publishers, 2005.