

Chem 004:011 — Principles of Chemistry I — Spring 2008

Professors Rohde, Small & Strathman

Course Objectives

Chem 4:011 is the first semester of a two-semester course sequence (004:011 / 004:012) that is designed to provide students with a broad overview of chemistry. Students will develop concepts and learn specific chemical information that will be applied within the context of a variety of chemistry related applications. Many of the applications that will be investigated will highlight contemporary social and scientific issues. Through participation in course activities, each student should expect to improve her/his knowledge of chemistry and to develop improved qualitative and quantitative problem-solving skills.

Course Structure and Instructors

Chem 4:011 consists of five components each with different instructors and scheduling. Attendance is expected at all five components of the course. Students should also expect to devote at least eight hours per week to out-of-class studying for this course (4 credits x 2 hours/credit).

- (1) **Lecture** – Profs. Rohde and Small
- (2) **Discussion Section** – Profs. Rohde and Small & a graduate teaching assistant (TA)
- (3) **Case Study** – Prof. Strathman
- (4) **Laboratory** – Prof. Strathman & a graduate teaching assistant (TA)
- (5) **Exams** – Profs. Rohde, Small and Strathman

| | | |
|---|----------------------|---|
| Lecture Section A – 8:30A – 9:20A MWF 225 CB | | Case Study & Laboratory time & room: see ISIS website |
| Lecture Section B – 10:30A – 11:20A MWF 225 CB | | |
| Chap. 1–3, 6, 17, 7, 8 | Chap. 4, 5, 9–12 | |
| Gary W. Small | Jan-Uwe Rohde | Amy E. Strathman |
| 238 IATL | 311G Chem Bldg | 245 Chem Bldg |
| 335-3214 | 335-2530 | 335-3234 |
| gary-small@uiowa.edu | chem-rohde@uiowa.edu | amy-strathman@uiowa.edu |
| M 3:00 – 4:30 P Th 1:30 – 3:00 P | T & W 3:00 – 4:30 P | W & F 9:30 – 10:30 A Th 11:30 A – 12:30 P |

TA Office Hours

Discussion and Laboratory Section teaching assistants (TAs) have scheduled office hours in Room 243 in the Chem Bldg. This room is normally open 8:30 AM – 4:30 PM, Mon – Fri. TAs for chemistry courses other than Chem 4:011 may also be able to assist you. (There are no TA office hours during the first week of classes.)

Discussion Section

Discussion Sections are limited to 24 students and complement the lectures. Students ask questions and gain problem-solving experience. Points are awarded for participation in Discussion Section activities. Discussion Sections do not meet the first week of classes (Jan. 22–25). For meeting times and room assignments see ISIS: isis5.uiowa.edu/isis/courses/search.page

Case Study / Laboratory

Activities: Activities for credit are conducted during Case Study and Laboratory periods. A Case Study is paired with each laboratory experiment and meets the week before each assigned experiment. Lab experiments provide students with the opportunity to do chemistry. Case Study/Lab sections **DO** meet Tues. – Thurs. during the first week of classes (Jan. 22–25). All case studies meet in **106 GILH**; for lab assignments see ISIS: isis5.uiowa.edu/isis/courses/search.page

Safety: Students must comply with laboratory safety rules at all times. Students must complete laboratory safety training and pass a safety quiz before they will be allowed to work in the laboratory. If a student fails to comply with laboratory safety rules, the student will be asked to leave the laboratory and points will be deducted.

Pregnancy: Many chemicals pose potential hazards to a fetus or young child. Women who are pregnant, nursing, or who expect to become pregnant are strongly advised to consult with their physician about the hazards of possible exposure to chemicals used in this course. MSDS and other information are available.

Course Content and Prerequisites

Content: chemical equations, stoichiometry, gases, thermochemistry, equilibrium, electronic structure of atoms, periodic trends, molecular bonding and structure, intermolecular forces, and modern materials.

Prerequisites: 22M:002 or ACT math subscore of 24 and MPT II score of 20, or ACT math subscore of 24 and MPT III score of 10. Students are required to take the Chemistry Diagnostic Test.

Course Materials

| | |
|---|---------------------|
| <i>Chemistry</i> , 4th ed., by Silberberg | (required textbook) |
| <i>WebAssign Access Card</i> | (required software) |
| <i>Lab Notebook (w/ carbonless copy pages) and laboratory goggles</i> | (required) |
| Case Study / Lab Experiment Manual (available only at downtown Zephyr Copy) | (required) |
| <i>Student Solutions Manual</i> , by Langley & Silberberg | (optional) |

Course Website

Chem 4:011 – Iowa Courses Online (ICON) website, URL = icon.uiowa.edu

Use your Hawk ID and Hawk ID password to login to ICON. This website includes links to the *Chemistry*, by Silberberg Companion Website (interactive quizzes, etc.), and the WebAssign (homework) website.

Online Homework

WebAssign is an Internet-based software package that helps improve problem-solving skills and concept understanding. 10% of your course grade will be based on your *WebAssign* scores. *WebAssign* is described more completely on the Chem 4:011 ICON website. Each of the 13 chapters has a WebAssignment. The Chapter 1 score is discarded; the final homework score is based on the 10 best of the remaining 12 scores. Chapter scores of 90% or above will be adjusted to 100%. Access *WebAssign* through the ICON website.

Course Administration

Go to the Chemistry Center, Room 231 CB, for drop/add signatures, make-up lab and exam scheduling, course handouts, alternate textbooks, section changes, or tutor lists. Hours are M–Th, 8–12 & 1–5 and F 8–12 & 12:30–4:30. The Chemistry Center Manager is Lin Pierce, 335-1341 or lin-pierce@uiowa.edu.

Grading

Semester grades will be based on three 1½-hour unit exams, a 2-hour final exam, homework, Case Study / Laboratory work, and Discussion Section participation; plus & minus grades will be awarded.

| | |
|------------------------------------|---------------------------|
| • 3 Unit Exams | = 450 pts. (45%) |
| • Final Exam | = 200 pts. (20%) |
| • Case Study & Lab Experiments | = 200 pts. (20%) |
| • WebAssign homework | = 100 pts. (10%) |
| • Discussion Section participation | = 50 pts. (5%) |
| <u>Total</u> | <u>= 1000 pts. (100%)</u> |

| | Lecture Questions | Lab Questions | Total No. of Questions |
|------------|-------------------|---------------|------------------------|
| Exam #1 | 27 | 3 | 30 |
| Exam #2 | 27 | 3 | 30 |
| Exam #3 | 27 | 3 | 30 |
| Final Exam | 36 | 4 | 40 |

Recommended Grade Distribution of the College of Liberal Arts & Sciences for Elementary Courses

| Grade | % of Class |
|-------|------------|
| A | 15 |
| B | 34 |
| C | 40 |
| D | 8 |
| F | 3 |

Average GPA = 2.5 out 4.0

Laboratory Component Requirements and Make-Up Information

A passing grade in Chem 4:011 requires successful completion of the Case Study / Laboratory portion of the course. This means: (i) you must receive at least 50% of the Case Study / Laboratory points, and (ii) you must complete at least four of the six laboratory activities. If a Laboratory is missed owing to illness, family emergency, or other qualifying excuse, a "Laboratory Make-up Request Form" must be submitted to the Chemistry Center. This form should be submitted within one week of the absence. Make-up laboratories will be held May 5–8 during scheduled laboratory section times. It may be possible to schedule a make-up CS/lab within a different laboratory section while the same experiment is being covered. However, for safety reasons, a request to attend a different section must be approved by Dr. Strathman prior to attending a laboratory section other than the one for which you are registered. If a Case Study is missed owing to a qualifying excuse, email Dr. Strathman immediately to inquire about make-up possibilities.

Examinations

There are three 1½-hour unit exams and a 2-hour cumulative final exam. Each of these exams will include Case Study / Lab questions (see previous page for how many). Exams are multiple choice. Students should bring a #2 pencil, their University ID, and a basic scientific calculator, such as a TI30X or TI30Xa, to each exam. Graphing calculators, programmable calculators, or data transmitting devices (e.g., PDA, laptop, cell phone) will not be allowed in the examination room. Exam rooms will be announced in class and posted on the ICON website.

Exam #1: Thurs, Feb 14, 5:30–7:00 PM – Chaps 1, 2, 3 & 4; safety/MSDS, CS 0, and CS/Lab 1

Exam #2: Thurs, Mar 13, 5:30–7:00 PM – Chaps 5, 6 & 17; CS/Lab 2 and CS/Lab 3

Exam #3: Thurs, Apr 24, 5:30–7:00 PM – Chaps 7, 8, 9, 10 & 11; CS/Lab 4 and CS/Lab 5

Final Exam: Tues, May 13, 4:30–6:30 PM – Chaps 1–12 & 17; all case study and lab topics

Exams will not be re-scheduled to accommodate holiday or other travel plans.

Review Sessions

The instructors will offer an evening Review Session two days before each unit exam. The sessions will be held in 225 CB. Attendance is optional.

Review Session #1: Tues, Feb 12, 8:00–10:00 PM

Review Session #2: Tues, Mar 11, 8:00–10:00 PM

Review Session #3: Tues, Apr 22, 8:00–10:00 PM

Make-Up Examinations

If an exam is missed owing to an illness, family emergency, or other university recognized excuse, to qualify for a make-up exam, written documentation must be submitted to the Chemistry Center no later than one week after the missed exam. Make-up exam rooms will be announced in class and posted on the ICON website.

Exam #1: Fri, Feb 22, 5:30–7:00 PM

Exam #2: Fri, Mar 28, 5:30–7:00 PM

Exam #3: Fri, May 2, 5:30–7:00 PM

Expectations

Examinations: You are expected to work alone. The instructors will employ statistical software to examine student answer sheets to identify copying on exams. Cheating will not be tolerated. See also the College of Liberal Arts & Sciences policy on Academic Fraud (below).

WebAssign homework: You are expected to do your own work, but discussion of problem-solving strategies with TAs and other students is allowed.

Laboratory: Data collection is a group activity (2 or 4 students). All data is expected to be collected in the laboratory. Use of data not collected by the author of the report or not acquired during the lab period, or use of fabricated data will be considered academic misconduct. Case study, pre-lab, and lab questions may be discussed in groups, but must be answered individually.

Supplemental Course Information

Additional course information will be announced in class and posted on the course website. For example, the first lecture and corresponding lecture notes are intended to supplement the syllabus in clarifying the policies of the course. Students are responsible for being aware of information posted on the ICON website.

College of Liberal Arts & Sciences Policies and Procedures

Administrative Home of the Course

The administrative home of this course is the College of Liberal Arts and Sciences, which governs academic matters relating to the course such as the add/drop deadlines, the second-grade-only option, issues concerning academic fraud or academic probation, and how credits are applied for various graduation requirements. Different colleges might have different policies. If you have questions about these or other CLAS policies, visit your academic advisor or 120 Schaeffer Hall and speak with the staff. The CLAS Academic Handbook also contains important CLAS academic policy: www.clas.uiowa.edu/students/academic_handbook/index.shtml

Academic Fraud

The University expects the highest level of integrity from its students. Plagiarism and any other activities that result in a student presenting work that is not his or her own are academic fraud. Academic fraud is reported to the departmental DEO and then to the Associate Dean for Academic Programs and Services who deals with academic fraud according to these guidelines: www.clas.uiowa.edu/students/academic_handbook/ix.shtml

Making a Suggestion or a Complaint

Students have the right to make suggestions or complaints and should first visit with the instructor, then with the course supervisor if appropriate, and next with the departmental DEO. All complaints must be made as soon as possible and always within six months of the incident.
www.clas.uiowa.edu/students/academic_handbook/ix.shtml#5.

Accommodations for Disabilities

The University upholds actions of diversity and inclusion. A student seeking academic accommodations first must register with Student Disability Services (3100 Burge Hall, 335-1462, www.uiowa.edu/~sds/) and then meet with a counselor in that office who reviews documentation and determines eligibility for services. A student approved for accommodations should then go to the Chemistry Center, Room 231 CB, to arrange particular accommodations.

Understanding Sexual Harassment

Sexual harassment is reprehensible and will not be tolerated by the University. It subverts the mission of the University and threatens the well-being of students, faculty, and staff. Visit www.sexualharassment.uiowa.edu/ for definitions, assistance, and the full University policy.

Reacting Safely to Severe Weather

The University of Iowa Operations Manual section 16.14 outlines appropriate responses to a tornado or to a similar crisis (www.uiowa.edu/%7Eour/opmanual/v/16.htm#1614). If a tornado or other severe weather is indicated by the UI outdoor warning system, members of the class should seek shelter in rooms and corridors in the innermost part of a building at the lowest level, staying clear of windows, corridors with windows, or large free-standing expanses such as auditoriums and cafeterias. The class will resume, if possible, after the UI outdoor warning system announces that the severe weather threat has ended (www.uiowa.edu/~pubsfty/siren.htm).

Student Classroom Behavior

The ability to learn is lessened when students engage in inappropriate classroom behavior, distracting others; such behaviors are a violation of the Code of Student Life. When disruptive activity occurs, a University instructor has the authority to determine classroom seating patterns and to request that a student exit immediately for the remainder of the period. One-day suspensions are reported to appropriate departmental, collegiate, and Student Services personnel (Office of the Vice President for Student Services and Dean of Students). www.uiowa.edu/~vpss/policies/ii/a.shtml

Case Study and Laboratory Schedule (Spring 2008)

Please check your ISIS schedule carefully and attend sections as summarized in the table below:

| Date | 100-Numbered Sections (Lab 121, 122, 131, 132, ...) | 200-Numbered Sections (Lab 221, 222, 231, 232, ...) |
|----------------|--|--|
| Jan 22 – 24 | Topic 0 Case Study (in 106 GILH) AM sections arrive at 8:30 AM PM sections arrive at 1:30 PM | Topic 0 Case Study (in 106 GILH) AM sections arrive at 9:15 AM PM sections arrive at 2:15 PM |
| Jan 28 – 31 | Topic 1 Case Study (Qual. Analysis, in 106 GILH) AM sections arrive at 8:30 AM PM sections arrive at 1:30 PM Safety Quiz (in lab after case study) | Safety Quiz (meet in lab) AM sections arrive at 8:30 AM PM sections arrive at 1:30 PM |
| Feb 4 – 7 | Topic 1 Experiment | Topic 1 Case Study (Qual. Analysis) |
| Feb 11 – 14 | Topic 2 Case Study (Hard Water) | Topic 1 Experiment |
| Feb 18 – 21 | Topic 2 Experiment | Topic 2 Case Study (Hard Water) |
| Feb 25 – 28 | Topic 3 Case Study (Food Energy) | Topic 2 Experiment |
| Mar 3 – 6 | Topic 3 Experiment | Topic 3 Case Study (Food Energy) |
| Mar 10 – 13 | Topic 4 Case Study (Nitric Oxide) | Topic 3 Experiment |
| Mar 17 – 21 | Spring Break | Spring Break |
| Mar 24 – 27 | Topic 4 Experiment | Topic 4 Case Study (Nitric Oxide) |
| Mar 31 – Apr 3 | Topic 5 Case Study (Quantum Dots) | Topic 4 Experiment |
| Apr 7 – 10 | Topic 5 Experiment | Topic 5 Case Study (Quantum Dots) |
| Apr 14 – 17 | Topic 6 Case Study (Structure & Function) | Topic 5 Experiment |
| Apr 21 – 24 | Topic 6 Experiment | Topic 6 Case Study (Structure & Function) |
| Apr 28 – May 1 | No Case Study | Topic 6 Experiment |
| May 5 – 8 | Make-up Labs ^{***} | Make-up Labs ^{***} |

^{***} Please see the "Laboratory Component Requirements and Make-Up Information" section of the syllabus for further information on make-up policies.

All Case Studies meet in Room 106 GILH.

All Laboratories meet in the Chemistry Building.

The last digit (one's place) of your laboratory section number indicates your laboratory room:
XX1 = 328 CB and XX2 = 324 CB.

The second digit (ten's place) indicates the day and time:
X2X = M-PM, X3X = T-AM, X4X = T-PM, X6X = W-PM, X7X = Th-AM, and X8X = Th-PM.
AM-sections begin at 8:30 AM and PM-sections begin at 1:30 PM.

Monday Lab-Sections Only

Due to the Martin Luther King holiday, Monday-sections will follow the schedule below:

| Date | 100-Numbered Lab Sections: Lab 121 & 122 | 200-Numbered Lab Sections: Lab 221 & 222 |
|--------|--|--|
| Jan 21 | Martin Luther King holiday No Class | Martin Luther King holiday No Class |
| Jan 28 | Topic 1 Case Study (in 106 GILH) starting at 1:30 PM Safety Quiz & Topic 0 (in lab after case study) | Safety Quiz & Topic 0 (meet in lab) starting at 1:30 PM |
| Feb 4 | Normal schedule see table at top of page | Normal schedule see table at top of page |

Chem 004:011 — Lecture & Exam Schedule — Spring 2008

| Date | Day | Lectures & Exams | WebAssign | Due Date |
|---------------|-----------|--|---------------------------------|------------------|
| Jan 23 | W | Course Introduction | | |
| 25 | F | Chap 1 – Keys to the Study of Chemistry | | |
| 28 | M | Chap 2 – Components of Matter | Chap 1 | Jan 28, 5:00 pm* |
| 30 | W | Chap 2 | (*Chap 1 – ungraded assignment) | |
| Feb 1 | F | Chap 3 – Stoichiometry of Formulas & Equations | Chap 2 | Feb 1, 5:00 pm |
| 4 | M | Chap 3 | | |
| 6 | W | Chap 3 | | |
| 8 | F | Chap 4 – Major Classes of Chemical Reactions | Chap 3 | Feb 8, 5:00 pm |
| 11 | M | Chap 4 | | |
| 13 | W | Chap 4 | | |
| 14 | Th | Exam #1 – Ch 1,2,3,4 & CS/Lab, 5:30 PM | Chap 4 | Feb 14, 5:00 pm |
| 15 | F | No lecture | | |
| 18 | M | Chap 5 – Gases & Kinetic-Molecular Theory | | |
| 20 | W | Chap 5 | | |
| 22 | F | Chap 5 | | |
| 22 | F | Exam #1 – Make-Up | | |
| 25 | M | Chap 6 – Thermochemistry: Energy Flow & Chemical | Chap 5 | Feb 25, 5:00 pm |
| 27 | W | Chap 6 Change | | |
| 29 | F | Chap 6 | | |
| Mar 3 | M | Chap 6 | | |
| 5 | W | Chap 17 – Equilibrium: Extent of Chemical Reactions | Chap 6 | Mar 5, 5:00 pm |
| 7 | F | Chap 17 | | |
| 10 | M | Chap 17 | | |
| 12 | W | Chap 7 – Quantum Theory & Atomic Structure | Chap 17 | Mar 12, 5:00 pm |
| 13 | Th | Exam #2 – Ch 5,6,17 & CS/Lab, 5:30 PM | | |
| 14 | F | No lecture | | |
| 15–23 | | Spring Break | | |
| 24 | M | Chap 7 | | |
| 26 | W | Chap 7 | | |
| 28 | F | Chap 8 – Electron Configuration & Periodicity | Chap 7 | Mar 28, 5:00 pm |
| 28 | F | Exam #2 – Make-Up | | |
| 31 | M | Chap 8 | | |
| Apr 2 | W | Chap 8 | | |
| 4 | F | Chap 8 | | |
| 7 | M | Chap 9 – Models of Chemical Bonding | Chap 8 | Apr 7, 5:00 pm |
| 9 | W | Chap 9 | | |
| 11 | F | Chap 10 – Shapes of Molecules | Chap 9 | Apr 11, 5:00 pm |
| 14 | M | Chap 10 | | |
| 16 | W | Chap 10 | | |
| 18 | F | Chap 11 – Theories of Covalent Bonding | Chap 10 | Apr 18, 5:00 pm |
| 21 | M | Chap 11 | | |
| 23 | W | Chap 11 & 12 | | |
| 24 | Th | Exam #3 – Ch 7,8,9,10,11 & CS/Lab, 5:30 PM | Chap 11 | Apr 24, 5:00 pm |
| 25 | F | No lecture | | |
| 28 | M | Chap 12 – Intermolecular Forces: Liquids, Solids, and | | |
| 30 | W | Chap 12 Phase Changes | | |
| May 2 | F | Chap 12 | | |
| 2 | F | Exam #3 – Make-Up | | |
| 5 | M | Chap 12 | | |
| 7 | W | Chap 12 | | |
| 9 | F | Catch-up Day & Review | Chap 12 | May 9, 5:00 pm |
| May 13 | T | Final Exam – Ch 1–12, 17 & CS/Lab – 4:30 PM | | |

**** Evening Review Sessions will be held on Feb 12, Mar 11, and Apr 22. ****