

CHEMISTRY 209
Madison Area Technical College
Fall 2009
Office hours: Mon, Wed, 5:30 PM
or by appointment

Instructor: David B. Shaw, Ph.D.
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College Chemistry 1

Required: Chemistry, by Raymond Chang, 9th Edition, (Random House, 2007).
Chemistry 209 SUPPLEMENTS, distributed by MATC bookstore
Laboratory Research Notebook, Jones & Bartlett Publishers
Pocket calculator: One capable of doing logarithms. (cost <\$12).

the above items can all be purchased at the MATC bookstore. Calculators may be purchased at several locations other than the MATC bookstore.

Programmable/Graphing Calculators (such as the TI-83 CANNOT be used for quizzes or exams).

Lectures: All sections will meet for the lectures in room 321. The course meets for a total of four hours of lecture each week. There will be a two-hour lectures on Monday and Wednesday (with a 10 minute break), from 3:30 to 5:20 PM.

Laboratories: All laboratory sessions will meet in room 331.

Section MonAM (also known as 20335) will have lab on Monday morning, 11:30 AM to 2:20 PM.

Section TueEarly (also known as 20337) will have lab on Tuesday afternoon, 1:00 to 3:50 PM.

Section TueLate (also known as 21101) will have lab on Tuesday afternoon, 4:00 to 6:50 PM.

Section WedAM (also known as 21103) will have lab on Wednesday morning, 11:30 to 2:20 PM.

The Course:

Chemistry 209 is the first semester of a year-long course in College Chemistry. The usual progression is for students in Chemistry 209 to take Chemistry 210 or Chemistry 212 as soon as possible thereafter. We know that Chemistry 212 will be offered in the Spring, and but not likely during the summer. If we do not offer the continuation next summer, the University does offer it in their regular 8-week summer session, but it is not inexpensive (around \$1500).

The two semester sequence 209-210 or 209-212 provide a general introduction to the facts and principles of chemistry. **Completion of the MATC course in Intermediate Algebra (or the equivalent, a COMPASS Math score of 66) is a prerequisite for this course. Some people have taken this course in high school (where it is called Algebra 2, or Algebra-Trig). Students without this background will be disenrolled from the course.** Students are able to go on to a course in Quantitative Analysis or Organic Chemistry if they pursue additional study of the subject of chemistry upon completing this 2 semester sequence.

A background in high school chemistry, General Chemistry (MATC Course Chem 134), or Nature of Chemistry, is a prerequisite for Chemistry 209. The course covers the fundamentals of chemistry including atoms, molecules, atomic theory, chemical formulas and equations, stoichiometry, energy relationships, properties of solids, liquids, and gases, chemical bonding and periodicity, solutions and concentration units. There is an emphasis on careful, exacting quantitative work. Efforts will be made to bring in relevant examples from related sciences.

Lectures and Class meetings:

During lectures we will discuss principles, outline goals, discuss topics from the text and other resources, and present illustrations and demonstrations. You should read the Chang textbook as we are discussing a particular topic. Each night, it is recommended that you review the day's lecture notes and the relevant portions of the text. The problems from the chapter are designed to help develop your knowledge of the topic and the required problem-solving skills.

Course Rules, Regulations and Overview:

This course requires high school chemistry as a background, but is not a re-hash of principles and applications from the preparatory course. Students need an adequate mathematical background to succeed in the course. This means having an algebra background at least of the level of Intermediate Algebra offered here at MATC. This chemistry course is 5 college credits, and the topics in this first semester course are fairly standard for any college or university in the United States.

Our experience has shown that the average student will spend a minimum of 10 hours each week, every week, during the semester on course work and materials. This recommendation is based upon **years of experience** in teaching this course. Some students may get by with less time, while others must spend many hours more each week. If you are unsure of the adequacy of your background, please speak with me immediately.

Please don't over-schedule yourself. Students taking this course will frequently be carrying a college credit load of 12-16 credits. If you fall in this category, please limit your outside employment to not more than 20 hours. Should you find you need to work much more than this amount,

YOU ARE ASKING THE COLLEGE TO STEAL YOUR MONEY

—very few people (perhaps 10% of all the people who have taken this course) have successfully combined a 25 hour per week job with a 12 to 16 credit program. Students with major family responsibilities must also take those needs into account in planning a class schedule.

Assigned Seats and Workstations:

In the laboratory, you will be assigned a workstation. That is to be your regular location during all laboratory classes. You will be sharing the equipment at this location with other students using the laboratory during that week. As a result, it is particularly important that all equipment be returned to the correct location and in a clean condition. In the lecture room I **usually** do not assign seats. This procedure will have to be modified in the event that students converse amongst themselves during lecture. This is a distraction to both the instructor and the students. I will only ask a person to stop such behavior once. After that, it will be necessary for me to assign a permanent seat of my choice, to ensure that the appropriate learning atmosphere is maintained.

Laboratory work:

In the laboratory, you will have the opportunity to experience directly some of the relationships discussed in lecture and the text and to apply experimental techniques to solving chemical problems. Some of the laboratory experiments are of a “discovery” type, where students will work in small groups to learn the specifics of a chemical principle. Many of the laboratory activities were modified as part of the “New Traditions” chemistry project at the University of Wisconsin—Madison, where Dr. Shaw was a member of the cooperative that developed new materials for the first year of college chemistry. Many of the experiments will involve drawing graphs using computers present in the laboratory.

Laboratory work will be successful only with adequate preparation. You are expected to read the experiment and to complete any pre-laboratory assignment **prior to** coming to lab. **The lab procedure and data tables must be placed in your laboratory notebook before coming to lab. People who fail to do so will not be allowed to do the experiment.**

For health and safety reasons, coats and excess books are not kept at the lab tables. There are racks inside the lab that will be made available to you during your laboratory class time. In the lab, you will have the opportunity to see firsthand, some of the relationships discussed in class and the text, as well as some experimental techniques applicable to problem solving.

Laboratory work is by nature slow and exacting, compared with text reading. It will proceed successfully only with adequate preparation. You will be expected to read the experiment and be ready to answer any background questions before coming to lab.

The write-up of the lab reports take some time. **Plan on blocking off up to 3 hours on Tuesday nights to complete the write-up of the experiment at home.**

The lab report will be due on Wednesday, each week, for people doing the lab on Monday, or Tuesday, 1-4 pm. The lab report will be due on Monday for all other students.

They are to be turned in to me personally, at the starting time of the lecture. Late reports lose one point each day. Please do not place them in my mailbox, or slide them under the door to my office. **All lab data, collected in the lab is to be done in pen. Let me say that again:**

**ALL LAB DATA, COLLECTED IN THE LAB IS TO BE DONE IN PEN,
DIRECTLY IN NOTEBOOK, NEVER RECOPIED! VIOLATION
RESULTS IN A DEDUCTION OF 20% OF THE CREDIT!**

Lab reports turned after the corrected versions have been returned to the class as a whole receive a grade of zero! Please turn reports in on time. I return lab reports VERY QUICKLY. If you turn it in late, it MIGHT BE WORTH NO CREDIT!!!

For safety reasons, no open toed shoes, sandals, or cloth-mesh running shoes are allowed in the lab. Long hair must be tied back. It is a requirement that all persons in an MATC chemistry laboratory must wear goggles at all times if anyone is using chemicals or glassware. **INSTRUCTOR-APPROVED SAFETY GOGGLES MUST BE PURCHASED BY THE STUDENT. KEEP THEM STORED IN THE LAB.**

Attendance:

Please come to class on time. I know 3:30 PM is not the most convenient time for a class, but that is the scheduled starting time for lectures. I will always let class out on time (but rarely early). As per the student handbook, **absences in excess of 25% of the total for the semester will result in the individual being dropped from the course**, regardless of the reasons for the absences. People are sometimes unavoidably late for class, and this is rarely a disruption to the lecture. However, in the lab, because of the detailed explanation and safety instructions that must be carefully outlined, I insist that people come to lab on time. A penalty will be assessed on each lab report if you come to lab after the starting time, regardless of the reason. Due to the tightly packed laboratory schedule here at Madison Area Technical College, there is no time available for making up a missed laboratory exercise.

Grading:

There will be three **110 minute** exams given on Wednesday, September 30, Monday, November 2, and Wednesday, December 2. Lab reports will be **due on Wednesday (for Monday and Tuesday 1 pm lab groups. The Tuesday 4-7 lab and the Wednesday students will turn it in the following Monday). Lab reports are due AT THE START OF THE 3:30 PM class.** There will be one laboratory practical exam, on November 23 and 24 (just before Thanksgiving). Those people who have lab on Wednesday will need to fit in a 90 minute slot on Monday the 23rd or Tuesday the 24th to take the lab practical exam.

Extra Credit:

There is none, other than any group quizzes or lab reports that are dropped in determining the semester grade, so please don't ask.

Assignments:

There are no "homework" assignments that will be graded. Problem sets will be recommended from the SUPPLEMENTS booklet on a regular basis (at least once a week). The answers to these problems are **already on reserve, in the library**, for you to use to check your work. **They are also AVAILABLE RIGHT NOW on Blackboard™, the web-based classroom management software adopted by the college. You can download all of the answers to the recommended problems as Adobe Acrobat files.** These problem sets should show you the types of questions to be mastered for examinations and quizzes. I strongly recommend people set up study groups (working perhaps with those in your "group quiz" group, mentioned below).

Each week on Wednesday, Dr. Shaw will distribute a copy of a typical 15-minute "quiz." You should take this "quiz" at home over the weekend, under test conditions (closed book, working individually). The answers will be posted outside the lab on Monday morning (and on Blackboard), for you to check your work. Like the recommended problems, these will not be collected, or graded. They are designed to show you the types of questions that will be encountered on the examinations.

Group Quizzes:

Numerous studies on learning [Active Learning: Cooperation in the Classroom by Johnson, Johnson and Smith, (1991) or Fleming and Mills, “Not another Inventory, Rather a Catalyst for Reflections” in *To Improve the Academy*, **11**, (1992), p. 137-155] indicate that people of all ages learn many things better by working in groups. We will be using biweekly group quizzes in class this semester. **The groups will be randomly generated at the start of the semester.** The groups MAY be changed at the midpoint of the semester, at the discretion of the instructor.

Group quizzes will be given every approximately every two weeks, on the following dates: September 2 (Wed), September 9 (Wed), September 23 (Wed), October 7 (Wed), October 21 (Wed), November 9 (Mon), November 23 (Mon), December 7 (Mon) . Each group of four (or fewer) people will be given 25 minutes to work together on the group quiz, and will turn in one paper—all members of the group will get the same grade. Each person in the group will get a photocopy of the corrected quiz. While there will be eight group quizzes, only the six best for each person will count towards the semester’s grade. To receive credit for the quiz, you must be in class, and be an active part of the group doing that day’s quiz. **No make-ups for missed group quizzes for any reasons whatsoever.**

THIS MEANS YOU!

Electronic Mail

I encourage everyone to make use of a student electronic mail (email) account here at MATC. You can access your MATC email from any computer that connected to the Internet. You may also have a regular email address that you prefer to use. I will ask you about that later during the first week of the semester.

Examinations:

There will be three major lecture exams, on the dates indicted on the outline: **Wednesday, September 30, Monday, November 2, and Wednesday, December 2.** I put a great deal of effort into developing an examination that carefully covers the material from the section of the course that is fair game for the exam. It is very difficult to develop a “make-up” exam that is fair to people who miss the regular examination, as well as those who take it. Also, in recent years, I have been disappointed by people who missed exams for reasons that were doubtful. As a result, here is the policy:

If you miss one of the three lecture exams that covers only a portion of the course, the makeup is as follows: a comprehensive multiple-choice examination, covering material in the first 12 chapters of the book. The makeup exam is Monday, December 7, 12:30 - 2:00 PM.

This means, for example, if you are unavoidably out of town on Wednesday September 30, and miss the scheduled lecture exam, you will make up the missed exam on December 7th (more than two months later), with a test that covers almost the entire semester’s work. Thus, each student should do everything possible to take the examinations at the scheduled time. **This make-up exam is only for people who miss one of the tests. It is not for people who score poorly on an exam and want to “have another chance.” If you also miss the make-up exam, then the final examination will count for 40% of the semester grade, instead of 25%.** There will be one major laboratory exam on November 23 or 24. No make-ups for missing the lab exam. It will

be counted as the equivalent of three laboratory reports, and will be not be “dropped” regardless of the performance on other laboratory work. **If you miss THAT exam, the final counts more than 25%!**

Grading:

To help you in keeping track of your grades, we have devised a sheet entitled “Student Record of Grades,” which will be distributed later in the week. After each quiz, exam, or lab, you can enter your score, so that you will have your own complete record, in one location, that tracks your performance in the course. I will remind you how to calculate your performance to date as the semester proceeds, after each major exam. Please keep track of the scores yourself. I will not do the calculation for you, or check my grade book “to see how I’m doing.” **It is the student’s responsibility to keep accurate records if (s)he is interested.**

The semester grade will be based on:

hour exams: 45%, final exam: 25%, lab work: 17%, group quizzes: 13%

The following are required for each letter grade:

A: 920 - 1000
AB: 900 - 919
B: 840- 899
BC: 820 - 839
C: 720 - 819
D: 670 - 719

Office hours: Mon, Wed 5:30 pm or by appointment
FINAL EXAMINATION: Thursday, December 17, 12:30 to 3:30 PM

CHEMISTRY 209**FALL 2009****Dr. Shaw****TENTATIVE COURSE OUTLINE**

Topic (chapter reference)	Dates (# of hours of lecture)
Introduction: The Study of Changes (chapter 1) Atoms, molecules and ions	August 25-27 (4)
(chapter 2, sections 1 through 5)	September 3-8 (3)
Chemical Nomenclature (sec. 2.6, 2.7+handouts)	September 8-10 (6)
Mass Relationships in Chemical Reactions (chapter 3)	September 15-17 (4)
Reactions in Aqueous Solution (chapter 4) and pH of strong acids & bases (sec. 15.2-15.3)	September 22-29 (5)

Lecture Exam #1: Wednesday, September 30

Properties of Gases (chapter 5)	Sept 29-Oct 8 (3)
Thermochemistry (chapter 6)	October 13-20 (5)
Quantum Theory and Electronic Structure of Atoms (chapter 7)	October 20-27 (4)
Periodic Properties of Elements (chapter 8, sec 1-4)	October 27-29 (3)
Chemical Bonding (chapter 9)	November 5-10 (3)

Lecture Exam #2: Monday, November 2

Molecular Geometries, VSEPR & Valence Bond Theories (chapter 10)	November 12-14 (4)
Physical Properties of Solutions (chap 12, sec 1-5)	November 10-17 (3)
Intermolecular Forces in Liquids & Solids (chapter 11, sections 1-9)	November 19-24 (5)
Physical Properties of Solutions (chap 12, sec 6-11)	December 1-8 (3)

Lecture Exam #3: Wednesday, December 2

review (includes lab time)	December 8-10 (4)
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FINAL EXAMINATION: Thursday, December 17, 12:30 to 3:30 PM

CHEMISTRY 209

FALL 2009

Dr. Shaw

L A B O R A T O R Y S C H E D U L E

Experiment	date : Mon/Tue/Wed
Introduction to the Lab, Safety Rules & Procedures	August 24/25/26
Experiment 1: Density and Solutions, part 1	Aug31/September 1/2
Nomenclature Drill	September 14/8/9
Experiment 1: Density and Solutions, part 2	September 21/15/16
no labs on Sept 22, 23	
exam review session	September 28/29/30
Experiment 9: Hydrates	October 5/6/7
Experiment 3: Salt Solutions	October 12/13/14
Experiment 4: Double Replacement Reactions	October 19/20/21
exam review and lecture	October 26/27/28
Experiment 6: Activities of Metals	November 2/4/5
Experiment 7: Mystery Solutions	November 9/10/11
Experiment 8: Spectroscopy of Wine	November 16/17/18
LABORATORY EXAMINATION	November 23 & 24
Experiment: 10: Solid-State Model Kit, exam review	Nov30/Dec1/2
open review	December 7/8/9

Final Examination: Thursday, December 17, 12:30 to 3:30 PM