CHM 201

Lecture/Discussion:	MW 3:00 – 4:30 107 PAD
Lab:	01 Th 1:00 – 2:50 337 PAD
	02 Th 3:00 – 4:50 337 PAD
Office Hours:	**TO BE ANNOUNCED**
Required Materials:	🕮Tillery, B., *Chemistry Chapters from Physical Science, 5th Edition* (customized), McGraw Hill/Primus. 2002. 🕮Lab Manual: Tanis, D., *Chemistry Laboratory Experiments, 10th Edition*, Grand Valley State University, 2004. ▪ Calculator capable of addition, subtraction, multiplication, and division. (Scientific notation and log functions are nice, but not necessary. Graphing calculators are OK.)
Special Note:	If you have any special needs due to a learning, physical, or other disability, please contact the Office of Academic Support (OAS) at 331-2490 and me.
Prerequisites:	None

CATALOG DESCRIPTION

Introduction to chemical sciences emphasizing the descriptive approach. Lectures, demonstrations, discussions, experiments, and assignments illustrate the chemical concepts as appropriate for K-8 teaching. K-8 science classroom visits will be arranged for students who plan to teach. Other students will write a term paper as part of course requirement. Fulfills Physical Sciences Foundation. (3-0-2). Four Credits.

GENERAL EDUCATION FOUNDATION CATEGORY: PHYSICAL SCIENCES

Category Purpose and Description. The physical sciences explore and seek to explain the behavior of the physical universe. They seek to understand the fundamental workings of nature, from the behavior of particles of matter to the functioning of the galaxies. Study of the concepts, history, contexts, and methodologies of the physical sciences assists students in becoming scientifically literate. Each course in this category is a broad introduction to one or more of the physical sciences. Courses contribute to the development of critical thinking and problem-solving skills, and help students apply an understanding of scientific ways of thinking to their own lives and careers.

Content Objectives

1. The introduction of the physical sciences as a "way of knowing"; an examination of principles and questions that define the field;
2. An understanding of how scientists use information and theory to explain the phenomena observed in the physical universe;
3. The unifying concepts of the physical sciences including the forces of nature, the structure of materials, and the role of energy in the physical universe.

Skills Objectives. This course uses teaching methods that help students become more proficient in the following skills:

1. To engage in articulate expression through effective speaking or writing;
2. To think critically and creatively;
3. To locate, evaluate and use information effectively.

COURSE OBJECTIVES

1. To develop an understanding of some of the basic concepts of chemistry.
2. To realize that chemical theories help explain macroscopic properties in terms of the interactions of atoms and molecules.
3. To experience physical and chemical changes in some simple systems on a first-hand basis.
4. To provide hands-on investigative experiences in science.
5. To provide science process experiences.
6. To encourage effective teaching through modeling desirable methods.
7. To develop an interest in and understanding of science in general, and chemistry in particular, so that as elementary teachers, you will have confidence in your ability to teach science with a reasonable degree of competency.
8. To write lab reports (see Laboratory Experiments below), lesson plans and unit plans (see In-School Project below) or an analytical paper (see Term Paper below) that effectively communicate information based on experiments and research.

COURSE REQUIREMENTS

You are required to attend four hours of lecture/demonstration/discussion each week, attend a laboratory period each week and submit the appropriate lab reports, complete and submit assignments, participate in class discussions, and satisfactorily complete three hourly exams and a final exam. Students will also be required to develop a unit plan and a lesson plan that incorporates some of the course materials for use in the student's own professional elementary teaching career and to observe an elementary classroom (which will also partially fulfill some School of Education requirements) or write a 10-12 page term paper on the application of one of the areas of chemistry discussed in the course to everyday life.

LABORATORY EXPERIMENTS

Laboratory performance is a requirement for this course. A report will be required for most of these experiments. The report can be turned in at the end of the laboratory period, but it is due at the beginning of the next class session following the lab.

GRADES

Grading will be based on the following percentage scale:

A	A-	B+	B	B-	C+	C	C-	D+	D	F
100%-93	92-91	90-89	88-81	80-79	78-77	76-69	68-67	66-65	64-57	56-0%

There will be no make-up exams. If you are unable to attend an exam, the points from that exam will be used to increase the weight of the comprehensive final. For example:

The course grade is determined by the weighted average of the following components. If you take all three hourly exams, then:

Component:	Exams (3)	Lab Average	In-School Project or Term Paper	Assignments	Final Exam
Weight	50 %	10 %	15 %	10 %	15 %

If you miss one exam, then:

Component:	Exams (2)	Lab Average	In-School Project or Term Paper	Assignments	Final Exam
Weight	33 %	10 %	15 %	10 %	32 %

If you miss two exams, then:

Component:	Exam (1)	Lab Average	In-School Project or Term Paper	Assignments	Final Exam
Weight	17 %	10 %	15 %	10 %	48 %

If you miss three exams, the additional absence will be assigned a percentage score of zero. *Hint: don't miss the exams!*

TENTATIVE LECTURE AND LAB SCHEDULE

Week	Text Chapter	Lab Experiment
January 10-13	Chapter 1 & Appendix A	Exp. 1 The Mysterious Closed System
January 17-20	Chapter 1 & Appendix A	Exp. 2 Introduction to Measurement Exp. 3 Densities of Warm and Cool Water
January 24-27	Chapter 9	Exp. 4 Gas Temperature and Volume
Jan.31- Feb. 3	Chapter 9	Exp. 5 Separation of Components of Kool-Aid Exp. 6 Physical Props of Solid & Liquid Sulfur
February 7	**Exam 1**	
February 7-10	Chapter 10	Exp. 7 Cooling Curves
February 14-17	Chapter 10	Exp. 8 The Periodic Law
February 21-24	Chapter 11	Exp. 9 "The Little Screamer" Conductivity Probe
Feb. 28- Mar 3	Chapter 11	Exp. 10 Qualitative Analysis of Household Compounds
Mar 2	**Exam 2**	
.		*Michigan Science Teachers Association Conference in Lansing, March 3-5*
Mar 4, 5 p.m	*Drop Deadline, Grade "W"*	
March 6-11	*Spring Break*	
March 14-18	Chapter 12	*No lab this week due to 21st Annual Regional Science Olympiad Tournament on March 19*
March 21-25	Chapter 12	Exp. 11 Counting by Weighing
Mar 28- Apr 1	Chapter 13	Exp. 12 Reactions Involving Changes in State
March 29	**Exam 3**	
April 4-8	Chapter 13	Exp. 13 Solution Formation Exp. 14 Molar Concentration
April 11-15	Chapter 14	Exp. 15 Use of Plant Pigments as Indicators Exp. 16 Properties of Acids and Bases
April 18	**Project/Term Paper Due**	
April 18-22	Chapter 14	Exp. 17 Polymer Properties Exp. 18 Polymer Densities
April 28	**Final Exam (2-3:50 p.m.)**	

LECTURE

Attendance at lectures is essential and expected. During lecture I will present concepts, show animations/movie clips, perform demonstrations and provide an opportunity for you to begin to practice new skills. Most lectures will also include group activities and quizzes. You will be placed into a group and be expected to sit with the members of your group in lecture in order to participate in group activities and quizzes. To prepare for lectures, read the suggested pages in your text. Lecture note outlines are available on the Blackboard course site under "Lectures" at least 2 days prior to each lecture. Print the outlines, review them and bring them to lecture. During lecture, take notes on your outlines. After lecture, read the text again along with your completed notes. Please remember to turn off your cellular phone or pager prior to coming to class.

SUCCESS IN CHEMISTRY

Success is a matter of exposure and practice. Take advantage of the "Discussion Board" on the Blackboard course site. If you have a question that may be of interest to your classmates, post it on the discussion board. I will respond, and I highly encourage all members of the class to get involved and chat about chemistry. I also recommend that you study with others outside of class. If you can explain a concept or idea to someone else, you must understand it first. Share your talents with others and take advantage of the rich talent surrounding you. You can form informal study groups, study with those in your lecture group or visit the Learning Center, 377 PAD (331-3639), to access MS^3 (Math and Science Student Support Services). The services are there to support your math and science study.

IN-SCHOOL PROJECT
The project has two parts: *School Visitation* and *Written Report*.

School Visitation:
I will help you set up the in-school experience, unless you know a teacher who is willing to work with you. It is your responsibility to make the specific arrangements for your visits. The cover letter and verification form provide additional information (See pages BLHA of this syllabus.)

1. Your **initial phone contact** with the teacher should accomplish the following:
   - Introduce yourself as a pre-service elementary teacher involved in a course in which you are learning how to teach science.
   - Exchange phone numbers and best times to call.
   - Establish time for your first visit. Find out where you can park (if needed). Also find out if you need to check in at the school office, and where you will meet your teacher.
   - Follow up your phone call with a brief note. Include the attached letter and form.
2. **Before** your visit, make a list of things you want to observe. Your list may include things like:
   - Structure of lesson. How does it begin/end; what are the students/teacher doing?
   - How are the students acting? Do their actions change as instruction changes?
   - What interactions occur between the teacher and student and between students?
   - What did you like most/least about the lesson/presentation/interactions/ behavior?

   These observations will become part of your **written report** for the project.
3. **First visit.** Dress and act appropriately. Remember, you are a guest in the classroom.
   - Take notes about your observations. These will become part of your written report.
   - Help out IF your help is requested. During this visit, you will primarily be an observer.
4. **Second and third visits**. These visits are to be planned by you and the teacher. You should assist the teacher in some way, or do some of your own teaching if both you and the teacher are comfortable.
   - Document what you did and your reactions to what happened. What did you like/dislike? What would you keep the same and why? What would you change and how/why?
   - Include copies of any materials you prepare for this experience, even if "all" you have are the notes you jotted down.

Written Report:
1. Your written report for the In-School Project will be composed of four parts:
   - The notes made of your **observations** during the visits. Do not recopy or type these notes.
   - A **unit plan outline.** This consists of five related lesson ideas related to topics we covered in class. These lesson ideas do not have to match what you did in your classroom visits. You must include:
     1. Title or theme of unit. Indicate the intended grade level.
     2. A short rationale or goal statement for the unit—why is it important for children to learn this?
     3. A brief (two or three sentences maximum) description of five lesson ideas that follow some logical sequence and are based on something from CHM 201. Include a stated objective and type of student activity in each. The first lesson needs to introduce the theme, the second through fourth need to build on that theme, and the last lesson needs to wrap up the theme.
     4. A brief explanation of how you would evaluate the students.
     5. You must cite all sources used in writing your unit plan. (See Reference Format section below.)
     6. Include a list of any resources/references that you used in developing the unit plan. (See Reference Format section below.)
   - A **lesson plan** for ONE of the lessons in the unit plan outline. Lesson plans take on may forms; the "best one" is the one that you can follow and that a substitute teacher could follow. If you have taken ED 200, lesson plan formats learned there are very appropriate to use here. Focus on the children you imagine yourself teaching. The activities need to be challenging, but not impossible. Include an outline for a worksheet or hands-on activity, IF appropriate. Include assessment ideas.
   - A **summary** of your written report and school visits. Reflect on the entire project. What did you learn? Expect? What would you change? What are your perceptions about yourself as a teacher?

You may want to check out the KCRC (K-12 Curriculum Resource Center, 1136 ASH) for examples of materials for this project.

TERM PAPER ALTERNATIVE TO THE IN-SCHOOL PROJECT

If you do not plan to teach, or if you do not wish to do the classroom visits/lesson plans, you may opt to write a 10-12 page term paper instead. The paper needs to apply one area of chemistry discussed in class to our everyday life or expand upon a clearly identified topic from class. Your paper must clearly demonstrate that you understand the chemistry you are talking about, and you must relate the theory to the application in everyday life. You must have at least five reference sources, one of which may be a book (not our text). The rest could be articles from journals/on-line sources/newspapers. At least one source must be from a science journal (as opposed to a "popular" magazine like *Newsweek* or *Time*). Your paper must be typed, and must include a bibliography.

Reference Formats for BOTH the In-School Project and for the Term Paper. References are to be numbered and alphabetized on your bibliography page. Cite references in the text of the project or paper, either by number (1) or first author and date (Atkins, 1997). Improper citations or reference formats will result in deductions.

Books: Last name, first initial for each author separated by commas. *Title of book.* Editor, if there is one. Publisher. Date. Pages or Chapters used.

1. Atkins, P. & Jones, L. *Chemistry: Molecules, Matter, and Change, 3rd Ed.*, W. H. Freeman & Co., 1997, Chapter 3. (This is for a book with two authors, no editor, chapter used)
2. *CRC Handbook of Chemistry and Physics, 64th Ed.* R. C. Weast, Ed. CRC Press, Inc., 1984, pp. 109-115. (This is for a book with an editor, but no authors, pages used)

Magazines or Journals: Last name, first initial for each author, separated by commas. *Title of magazine or journal*—use standard abbreviations, if known. **Year**. Volume # (issue #, if given), pages used.

3. Alexander, C. *National Geographic*, **1998**, 194(5), 83-101. (magazine)
4. Tanis, D. *J. Chem Educ.*, **1990**, 67(1), 602-603. (journal)

Newspapers: Last name, first initial of author. *Title of newspaper*, Title of article. Full date, page.

5. Kong, D. *The Grand Rapids Press*, Medical ethicists question use of humans in psychosis study. Jan. 3, 1999, p. A6.

Internet information: Internet information can be a double-edged sword. If you can't track the web page back to either a college or university, a government organization, or a company that seems credible, don't use it. In other words, J. Jones' personal web page is probably not much more than opinion, and unless you want to cite opinion (and not fact), be very careful! A good internet citation must include the following: Author (Whose page is it? Organizations are OK as authors), *FULL internet address* (as in, I type in the address and get the page you were on). A one or two sentence description of the page, report, or source. Month and year you accessed the material.

6. Ellis, A. B., Cappellari, A., Lorentz, J. K., Moore, D. E. & Lisensky, G. C. *http://www.chem.wisc.edu/~concept* Experiences with chemistry ConcepTests, site maintained by the University of Wisconsin-Madison. Accessed January, 1999.

If you have questions, please ask. The main idea behind all reference citations is to provide enough information so that someone else can find what you used.

All **In-School Projects and Term Papers are DUE** at the beginning of class on **Monday, April 18**.