ADVANCED GENERAL CHEMISTRY / F02

Section 001

Dr. Andrew Pounds,

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Office Hours:	MW 3:00-4:00, (or by appointment)

CHM 115 is an accelerated general chemistry course which seeks to unify many of the themes in General Chemistry to develop a comprehensive conceptual understanding of the subject. Students in CHM 115 will be introduced to the microscopic and macroscopic descriptions of matter and its behavior. They will be exposed to the fundamental laws of mass and energy conservation and their application to chemical systems and reactions. Students will also be introduced to the fundamentals of chemical thermodynamics and its bearing on equilibrium in gases, acids and bases, and ionic solutions. Students in CHM 115 are expected to read at the college level and also set up and solve algebraic equations, trigonometric equations, and equations involving differentials. For that reason, MAT 191 (Calculus) is a corequisite for the course. Upon completion of this course, a student will demonstrate competence in each of the following areas:

- solving chemical problems,
- understanding chemical concepts from the lecture by successfully applying these concepts on homework and tests,
- making accurate physical and chemical measurements in the laboratory, and
- writing clear and concise laboratory reports.

Class Meeting Times and Locations

Lecture:	MWF 9:00–9:50 a.m., WSC Room 322
	R 9:25–10:15 a.m., WSC Room 322
Lab:	R 3:05 a.m – 5:45 p.m., WSC Room 308

Course Materials

Principles of Modern Chemistry, Oxtoby, Gillis, and Nachtrieb 4th ed.,
Laboratory Notebook (numbered, carbonless pages, available at bookstore)
Scientific Calculator
Approved Safety Glasses/Goggles
Lock (for lab drawer)

Course Structure

The three lecture hours each week will be used to expound on and augment the text. An additional hour each week will be used to explore advanced problem solving techniques as well as computational problem solving methods. Students are responsible for all material covered in class as well as the material from the textual sections listed in the class schedule. While homework will not be collected, students are encouraged to complete as many problems as possible to gain competency with the material. Several unannounced in-class quizzes will be given during the semester. The best five grades from the quizzes will count toward the final grade. Three hour-long exams will be given per the schedule. A three hour final exam will be administered at the end of the term.

Grading

Tests (4 @ 100 pts)	400 pts
Quizzes (best 5 @ 20 pts)	100 pts
Laboratory (14 @ 20 pts	280 pts
Final Exam	220 pts
Total Possible	1000 pts

The following grading scale is assured but *may* be *slightly* lowered based on test results.

A $\geq$900 pts
B $\geq$800 pts
C $\geq$700 pts
D $\geq$600 pts
F $<$600 pts

General Information

Honor Code: All students in CHM 115 are expected to adhere to the Mercer University Honor Code. Any suspected violations will be reported to the Honor Council for further investigation.

Attendance: Except for the first day of the semester, attendance will not be taken. However, students are still accountable for all material covered in class as well as any announcements made during the lecture period.

Missed Quizzes: No makeup quizzes will be given.

Missed Exams: Anyone missing an exam for *any* reason (personal illness, death in the immediate family, or other emergency) must notify Dr. Pounds in advance. The absence will be considered unexcused otherwise. Make-up exams will be individually scheduled.

Partial Credit: Partial credit will not be awarded on any quiz, exam, prelab, or lab report unless individuals show their work and clearly delineate how they arrived at their answers.

Re-grading Policy: If a student suspects that an error was made in the grading of a submitted work, they may return the paper for re-grading with the understanding that the entire work will be re-graded and not only the portion in question.

Posting of Grades: Grades in CHM 115 will not be publically posted. If you have questions regarding your grade, see Dr. Pounds.

American Disability Act: "If you believe that you possess a disability for which reasonable accommodation must be made, you must consult with the instructor at the close of the initial class meeting. The instructor will refer you to the Office of the Dean of Students for evaluation, documentation of your disability, and a recommendation as to the accommodation, if any, to be provided. If you do not consult with the instructor and follow up with the Office of the Dean of Students, as instructed above, you will thereby waive any claim to a disability and the right to any accommodation pertaining thereto."

Electronic Submission of Materials: "Students bear sole responsibility for ensuring that papers or assignments submitted electronically to a professor are received in a timely manner and in the electronic format(s) specified by the professor. Students are therefore obliged to have their e-mail client issue a receipt verifying that the document has been received. Students are also strongly advised to retain a copy of the dated submission on a separate disk. Faculty members are encouraged, but not required, to acknowledge receipt of the assignment."

Tips for Succeeding in Chemistry 115

There is unquestionably a lot of material to be covered in Chemistry 115. For that reason it is imperative to keep up with the class. The last thing you want to worry about is covering two chapters of new material the night before the test. You are expected to keep up with the class reading and problems. The unannounced quizzes are an added incentive for you to do this.

You should work as many problems as you can from the text. These problems are representative of some of the problems you will see on the exams. To become proficient you will need practice. The student solutions manual provides solutions to the odd numbered problems. In addition, solutions to the even numbered problems listed in the class schedule will be posted on the WWW (`http://theochem.mercer.edu/chm115`), or worked in class. Students who need solutions to additional even-numbered problems should contact Dr. Pounds.

For more help in the course you should utilize the SI sessions for your class as well as the University's free tutoring service. Both of these resources are here for you to use and, although they can not guarantee a higher grade in the course, they will most likely increase your understanding of chemistry and thereby positively affect your performance in the class.

Tentative Class Schedule[1]

Week Starting	Chapter Sections	Lecture and Problem Solving Topics
August 19th	Appendices A-C	Mathematical Preliminaries
	1.1–1.7	Foundations of Atomic Theory
August 26th	2.1–2.5	Stoichiometry
	3.1–3.7	Electronegativity
		Classical Bonding Theory
September 2nd	15.1–15.9	Quantum Mechanics
	16.1–16.9	Molecular Orbital Theory
September 9th		**EXAM #1 (9/9)**
	4.1–4.7	Gases
		Real Gases
September 16th		Intermolecular Forces
	5.1–5.6	Condensed Phases
		Phase Diagrams
September 23rd	6.1–6.6	Solutions
		Colligative Properties
		Mixtures and Distillation
Septembver 30th		**EXAM #2 (9/30)**
	7.1–7.6	Themochemistry
		Thermodynamics
October 7th	8.1–8.7	Spontaneity
	9.1–9.5	Gas Phase Equilibrium
		The Approach to Equilibrium
October 14th	9.1–9.5	**FALL BREAK**
	13.1–13.7	Kinetics
October 21st		Rates of Reactions
		Activation Energies
	14.2–14.3	Nuclear Reactions
October 28th		**EXAM #3 (10/28)**
	10.1–10.8	Acid-Base Theory
		Acid-Base Equilibrium
November 4th		Buffers
		Polyprotic Acids
	11.1–11.8	Solubility
November 11th		pH and Solubility
		The Solubility Product
November 18th	12.1–12.5	Redox Reactions
		Balancing Redox Equations
		Electrochemical Cells
November 25th		Electrode Potentials
		THANKSGIVING BREAK
December 2nd		Faradays Laws
		Thermodynamics and Electrochemistry
		EXAM #4, (12/6)
December 9th		REVIEW
		FINAL EXAM, 12/12/02, 9 a.m.
		(Thursday)

[1] I reserve the right to modify this schedule as situations warrant.

The Laboratory

Students are **expected** to prepare for lab by downloading laboratory instructions and report forms from the online repository (`http://chemistry.mercer.edu/dem/chm111-112/chm111.htm`). Students will be expected to follow *all* of the safety procedures outlined in the laboratory instructions and during the pre-lab meeting. STUDENTS WHO ARE IMPROPERLY CLOTHED OR WHO DO NOT HAVE THEIR SAFETY GLASSES WILL NOT BE PERMITTED TO ENTER THE LAB. Failure to follow any of the lab safety procedures will result in a 10% point reduction for the laboratory experiment being performed.

Lab grades will consist of 14 lab reports at 20 pts for a total of 280 pts.

All data from the lab should be recorded in the lab notebook, not the report sheets, using a black or blue ball-point pen. Each page needs to show your name, date, and experiment title. Do not remove the original pages from the notebook. The yellow copies from the notebook will occasionally be collected at the end of lab. If the pages are not collected at the end of lab then they should be turned in with the lab report.

Lab reports should be turned in *at the beginning* of the subsequent laboratory period. Late lab reports will penalized 20%/day. The final lab report should be turned in on the last day of class.

All lab reports will be typed and should minimally consist of the collowing sections.

1. Abstract – in no more than five sentences summarize the experiment and the relevance of your results.
2. Procedure – in this section briefly summarize what method you used to conduct the experiment. The primary goal of this section is to convince the reader that your procedure is an effective means to answer the proposed hypothesis.
3. Results – clearly show your results and the methods you used to analyze the data. This will ofter require the use of spreadsheets, tables of data, and graphs.
4. Discussion – Often there will be a question posed by the instuctor in the pre-laboratory lecture. It will be your responsibility in this section to answer the question based on your experimental data and your conceptual knowledge of chemistry.

Students may collaborate on the data analysis in lab reports, but each student is expected to individually write the lab report submitted for grading.

Once you check into lab you are personally responsible for all contents of your lab drawer. You will not be permitted to take the final exam for the course until you check out of lab and pay any lab fees.

It is imperative that you attend lab on the date scheduled. Because there is only one section of CHM 115, it will be impossible to make up any labs. Absences due to medical illness or mechanical failures are considered excused. If you are going to miss lab for any reason except a mechanical failure, you must notify Dr. Pounds prior to the absence or the absence will be considered unexcused. Unexcused lab absences will result in a zero grade for the lab and more than one unexcused absence will result in a failing grade for the course. In the event that a student is granted an excused absence, the average of their other lab grades will be used to compute the missing grade. Students who have a excused absence for a University sanctioned event still must notify Dr. Pounds if they are going to miss lab. Missing more than three labs, excused of unexcused, will result in a failing grade in the course.

Laboratory Schedule

Lab Day	Experiment
August 29^{th}	Check-in, Atomic Spectra
September 5^{th}	MALDI Lab
September 12^{th}	Measuring Uncertainty
September 19^{th}	Preparation of Alum
September 26^{th}	Freezing Point Depression
October 3^{rd}	Thermochemistry - Heat of Reaction
October 10^{th}	Themochemistry – Solubility of Borax
October 17^{th}	NO LAB – Fall Break
October 24^{th}	Spectroscopic Determination of Ni^{2+} Preparation of 0.13 M NaOH
October 31^{st}	Kinetics - Concentration Effect
November 7^{th}	Kinetics - Temperature Effect Standardization of 0.13 M NaOH
November 14^{th}	Gas Equilibrium: NO_2 Properties
November 21^{st}	Equilibrium in Aqueous Solutions
November 28^{th}	NO LAB – Thanksgiving
December 5^{th}	Acids, Bases, and Buffers Check-Out

Electronic Mailing List Procedures

For numerous reasons I decided recently to move all of my course related e-mail distribution lists to an electronic mail server. If you want to get e-mail that I send to the class (like what to study for exams), then you must subscribe to this e-mail list server. However, since there is the possibility that people can abuse such servers, I have added a few security features. While these security features make it a little harder to subscribe or unsubscribe from the list, they also protect you from getting "spammed".

To subscribe to the list server, send an e-mail to

`majordomo@theochem.mercer.edu`

with no subject and a message that says

```
subscribe chm115-L  <address> <-- your preferred e-mail address
end
```

The `end` at the end is important. If you send this message from the e-mail address where you typically receive you mail, you can leave the address blank. If you want to receive e-mail at another address, then include the FULL e-mail address above. For example, if you read your e-mail from the account `surfer@yahoo.com` the you would get onto that account and send the following message to `majordomo@theochem.mercer.edu`:

```
subscribe chm115-L
end
```

If your name were John Smith and you want to receive e-mail at your Mercer e-mail, then you would simply send:

```
subscribe chm115-L
end
```

to `majordomo@theochem.mercer.edu` from your Mercer e-mail account. Now, if you subscribe to the list server from you Mercer e-mail, but you want the messages to go to your `surfer@yahoo.com` address, then you would send the following message:

```
subscribe chm115-L surfer@yahoo.com
end
```

To avoid any security issues, the listserver will send a message *to the account that is supposed to receive the e-mails* asking you to verify your request. Simply send a second message to `majordomo@theochem.mercer.edu` with the security tag sent to you by the listserver. The security tag will look somthing like

```
auth 7f71777b subscribe chm115-L smith_ja@mercer.edu
```

So the response you send to `majordomo@theochem.mercer.edu` would be (depending on the security tag sent to you):

```
auth 7f71777b subscribe chm115-L smith_ja@acadmn.mercer.edu
end
```

An added bonus to this is that if you want to send an e-mail to all the students in the class, you can simply send it to `chm115-L@theochem.mercer.edu` and it will go to everyone subscribed! At the end of the term I will delete the subscription list. If you, however, want to unsubscribe before then, simply send a message to `majordomo@theochem.mercer.edu` with the message

```
unsubscribe chm115-L
end
```

If you have problems getting on the listserver, come see me. If you want to contact just me then please send e-mail to `pounds_aj@mercer.edu`.