

Instructor: Dr. Pentecost
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Lecture **10:** MTWR 8:00 - 8:50 a.m. 101 LTT

Discussions

11: T 10:00 – 10:50 a.m. 207 PAD

13: T 1:00 – 1:50 p.m. 207 PAD

12: T 11:00 – 11:50 a.m. B-1-112 MAK

14: T 4:00 – 4:50 p.m. A-2-117 MAK

Office Hours Monday 9:00 – 9:50, Tuesday 2:00 – 3:50, Thursday 4:00 – 4:50 & Friday 8:00 – 8:50 (in MS³). Other times are available by appointment.

Prerequisites - CHM 115 or an equivalent course and MTH 122 (or higher) It is assumed that the students in 116 have a reasonable understanding of the material from first semester chemistry. It is also assumed that the students have the mathematical skills (algebra and logarithms) required to solve problems.

Course Materials (Required)

1. Tro, *Chemistry: A Molecular Approach*, Prentice Hall, 2011
2. Laboratory Manual, "Chemistry 116: Principles of Chemistry II", 2010-2011.
3. Subscription to WebAssign for online homework (\$19.95)—webassign.com. You must enroll by January 21st for your homework to count.
4. A basic scientific calculator capable of scientific notation, log/antilog, and ln/e^x functions. Calculators or devices with actual text keys or devices that can send messages are **NOT ALLOWED ON EXAMS. NO EXCEPTIONS.** Calculators cannot be shared on exams.

Course Content

This course will seek to address three fundamental questions about chemical reactions.

- 1) Do all reactions go to completion?
- 2) What determines how far a reaction will go?
- 3) What are the details of the route from reactants to products?

To answer these questions will require us to explore equilibrium, thermodynamics and kinetics.

MS³ (Academic Support)

MS³ is a learning center that offers academic support for students in the fields of Science and Mathematics. MS³ is located in **399 Padnos**. Please stop by and plan to avail yourself of the services of MS³. Our facilitators, upper-level students who have mastered content in various science and mathematics courses, provide academic support. MS³ is a **walk-in service** (no appointment needed) where facilitators provide one-on-one as well as group tutoring for students. Facilitators also visit classes, develop and assist study groups, and maintain contact with faculty, in order to better aid students with current course content. Other services that MS³ provides are: Test Banks, Current Texts for use in Learning Center, and Study Aids such as Learning Style Analysis & Study Skills.

What courses do we facilitate?

Chemistry: 109, 115, 116, 230, 231, 232, 241, and 242.

Physics: 200, 220, 221, 230, and 231.

Math: 097, 110, 122, 123, 201, and 202.

Biomedical Science: 208, 212, 250 and 290.

Biology: 120, 121, and 355/375.

For more information, contact the MS³ facilitator help-desk at 331-3695, or the Program Coordinator at 331-3267. You can also find up to date information on our website at www.gvsu.edu/ms3

*“Science learning is an active process, the teacher’s task necessarily involves more than the mere dissemination of information. ...the teacher’s fundamental task is to get students to engage in learning activities that are likely to result in their achieving these outcomes, ...it is helpful to remember that **what the student does is actually more important in determining what’s learned than what the teacher does.**”*

-Shuell, T. (1986). *Review of Educational Research*, 56(4), 411-436.

Course Expectations

The quote above is a nice summary of my teaching philosophy. I will try to get establish an environment in the class that can maximize the potential for success – but remember the most important thing is what you do. You must decide what level of achievement you wish to achieve in the course. Once this decision has been made you will need plan to devote an appropriate amount time to the material out-of-class. Very few people can master the material without this out of class effort. We will cover most topics in class, but there will be times when you are expected to cover topics not discussed in lecture or lab.

I am happy to answer questions by email. So that I don't mistake your message for spam (I don't always recognize email addresses) please type CHM 116 (or something similar) in the subject line. I'll do the same if I email you or email the class.

The following are what I expect of you. These expectations have been established to help you achieve the learning objectives of the course. They will also allow me, and you, to evaluate your achievement of the objectives.

- **Lecture:** As you may have noticed this is not a small class. I will try my best to get to know each of you. You can help this by asking questions both during lecture and discussion as well as during office hours. Remember my goal is to help you learn. I cannot do it for you. So when you ask questions please do so after so effort on your part. Time in lecture will be spent taking notes and completing in-class activities. For most of these activities you will be encouraged to work together. Many of these activities will give me, and you, an opportunity to gauge your understanding of the course materials. My goal is to make the lecture more active than you simply listening to me drone on and on. You can help with this by paying attention, resisting the urge to surf the web, carry on non-class related conversations, etc... So, please no iPods during class. Please turn off your cell phones. One of my responsibilities is to maintain a classroom environment that is supportive for learning. I understand that there are times when you may need to leave your cell phone on, sick children etc..., please let me know if this is the case.
- **Discussion:** Time in the discussion section will be spent working through activities designed to reinforce and expand upon topics covered in lecture. Many of these activities will be very similar to the types of questions I ask on exams so it is in your best interest to attend! Besides there are fewer students and I will be able to spend more individual time with you to answer your questions.
- **Homework:** The only way to succeed in chemistry is to work lots of problems and questions. I encourage you to work in study groups. Voluntary collaboration on homework is perfectly acceptable. There will be two types of homework assignments in this course. The first will be suggested problems from the textbook. You should work these as we progress through the material. These will **not** be collected or graded. The second homework type will be *On-line Homework*. Graded homework problem sets will be available from WebAssign. A link to the WebAssign site and the tentative due dates are

in the Assignments folder in Blackboard. Each homework set will be available for about a week, times announced in class and posted on BB. You may repeat each homework set as many times as you wish during the time you have to complete it. Your lowest homework grades will be dropped. Late homework is not accepted.

To access WebAssign, complete the following:

1. Go to webassign.net
2. Select "login", then "I have a class key". Enter the following: **gvsu 3766 2836**
You should see a message for CHM 116, section 10, Pentecost after you hit submit.
3. Select "Yes is this my class" and "I need to create a WebAssign account". Then continue.
4. Complete the form. Please use your GVSU username and G-number.

- **Tests/Quizzes:** Quizzes in my class serve two functions: First they give me a way to assess how things are going. For me to gather this data we will have four quizzes @ 25 points each. These will be announced ahead of time. The second function for a quiz is for you to check how you are doing!

The course material is divided into four units. At the end of each unit we will have an in-class test to measure your understanding of the material. The format for these will be short answer, multiple choice, and problems. I should explain my philosophy for tests. I use exams to see what you can do. I work very hard to make the exams fair but challenging. I will keep track of the exam averages and if they are out of line I will adjust the grading scale accordingly. So the moral of the story is to do your best and show improvement over the semester.

The final exam will be a comprehensive part covering material from the first four units. The final exam for this course will be **Monday, April 25th from 8:00 am until 9:50 am**. If you miss an exam for a valid reason your percentage on the final exam will replace the missed exam grade.

- **Laboratory:** A grade of at least 60% is required in lab in order to pass the course; you cannot pass the course if you earn a failing lab grade. Due dates and formats will be discussed in lab. Turn lab reports in to your lab instructor.

Grades

Exams (4 total):	400 points (100 points per exam)
Final exam	150 points
Homework	50 points (Calculated using your HW average)
Quizzes:	100 points
Participation	15 points
Lab:	85 points (Calculated using your average lab grade)
Total	800 points

Final course grades will be based on your percentage of the possible points. The tentative scale is below. This may be adjusted slightly.

A	100 – 93 %	B+	89 – 87 %	C+	79 – 77 %	D+	69 – 67 %
A-	92 – 90 %	B	86 – 83 %	C	76 – 73 %	D	66 – 60 %
		B-	82 – 80 %	C-	72 – 70 %	F	below 60 %

Important Dates

Last day to register/drop/add	January 14 th
Last day to drop with W grade	March 11 th
Comprehensive Final Exam	April 28 th

CHM 116 Winter 2011 Lab Calendar

Week	Dates	Experiment
1	Jan. 10 – Jan. 14	No Lab
2	Jan. 17 – Jan.21	Preparation of Solutions
3	Jan. 24 – Jan.28	Equilibrium Behavior of an Acid-Base Indicator
4	Jan.31 – Feb. 4	Chemical Equilibrium
5	Feb. 7 – Feb. 11	Strong Acid-Strong Base Titrations
6	Feb. 14 – Feb. 18	Determination of pKa and pKb using Acid-Base Titrations
7	Feb. 21 – Feb. 25	Investigation of Buffers
8	Feb. 28 – Mar. 4	Determination of a Solubility Product Constant
9	Mar. 7 – Mar. 11	Semester Break; no labs
10	Mar. 14 – Mar. 18	Shifty Equilibria Part 1
11	Mar. 21 – Mar. 25	Shifty Equilibria Part 2
12	Mar. 28 – Apr. 1	Shifty Equilibria Part 3
13	Apr. 4 – Apr. 8	Equilibrium and Thermodynamic Study of Borax
14	Apr. 11 – Apr. 15	Kinetics of Hydrogen Peroxide
15	Apr. 18 – Apr. 22	Lab Practical
16	Apr. 25 – Apr.28	Finals week; no labs

Incomplete

A grade of "I" may be granted if a student is temporarily unable to complete course requirements because of unusual circumstances beyond the control of the student. This grade is NEVER given as a substitute for a failing grade or a withdrawal. An "I" will not be assigned for work that was due before the 8th week of the semester. Written requests for an "I" must be submitted PRIOR to the final exam.

Accommodations

If you need academic accommodations because of a learning, physical, or other disability, please contact Disability Support Services (DSS) at 331-2490. Furthermore, if you have a physical disability and you think you will need assistance evacuating this classroom and/or building in an emergency situation, please make me aware so I can develop a plan to assist you.

TENTATIVE Lecture Schedule

Week	Dates	Topics and Sections from textbook
1	1/10 – 1/13	Chemical Equilibrium (Sections 14.1 – 14.7)
2	1/17 – 1/20	Equilibrium Calculations & Solubility (Sections 14.7 – 14.9 & 16.5) Quiz 1 on 1/20
3	1/24 – 1/27	Solubility and Complex Ions (Sections 16.6 – 16.8)
4	1/31 – 2/3	Test 1 – 1/31 Acids, Bases, & pH (Sections 15.1 – 15.4 & 15.7)
5	2/7 – 2/10	Weak Acid/Base Calculations and Structure and Acid Strength (Sections 15.5, 15.6, 15.10)
6	2/14 – 2/17	Uncommon Acids & Bases – Hydrolysis & Lewis Theory (Sections 15.8 & 15.11). Quiz 2 on 2/14
7	2/21 – 2/24	Test 2 on 2/21 Buffers (Sections 16.1 – 16.3)
8	10/18 – 10/15	Titrations & Polyprotic Acids (Sections 16.4 & 15.9)
9	3/7 – 3/10	Spring Break – No Classes
10	3/14 – 3/17	Spontaneity and Entropy (Sections 17.1 – 17.4) Quiz 3 on 3/15
11	3/21 – 3/24	Free Energy (Sections 17.5 – 17.7)
12	3/28 – 3/31	Free Energy and Equilibrium (Sections 17.8 – 17.9) Test 3 on 3/31
13	4/4 – 4/7	Electrochemistry (Sections 18.1, 18.2 – 18.6)
14	4/11 – 4/14	Rates of Chemical Reactions (Sections 13.1 – 13.5) Quiz 4 on 4/12
15	4/18 – 4/21	Mechanisms of Chemical Reactions (Sections 13.6 & 13.7) Test 4 on 4/20

Cumulative final exam: Monday, April 25th from 8:00-9:50 am in 101 LTT