Syllabus for Chemistry 102, Spring 2015

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Required Materials

- Chemistry: A Molecular Approach Plus 3/E, by Nivaldo J. Tro, © 2014 ISBN-13: 978-0-321-80924-7 with MasteringChemistry™ with full e-text and electronic student solutions manual (Course ID: **MILLIGAN102SPRING2015**). MasteringChemistry™ is ***required*** for this class.
- Lab Manual for Chemistry 102, Department of Chemistry, Los Angeles Valley College, © 2015. Download from: http://www.ars-chemia.net/Classes/102/manual/102_manual_index.htm
- HGS Molecular Model Structure Kit, available at the bookstore or online (at

  http://www.maruzen.info/hgs/catalog/index.php?cPath=4&osCsid=n249c4abaukrn902a0q408dk93

  look for either 1006 (good for this class and useful for 211/2) or 1005 (really good for 211/2))
- Safety in Academic Chemistry Laboratories, Vol. 1, Published by the American Chemical Society: ISBN 0-8412-3863-4. Download from:

  http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/publications/WPCP_012294

  This is required reading ***before*** any laboratory work is started.
- Scientific Calculator (it must be capable of scientific notation and logarithms)
- Safety Goggles (they ***must*** be the type that completely covers your eyes with the elastic band, no shop goggles!).

Student Learning Outcomes

Solve chemical problems involving kinetics, equilibrium, thermodynamics and electrochemistry.

Course grading

There will be no extra credit given! The time to start worrying about your grade is now, not in the 12th week of the semester. The grading in this course is on a straight scale.

90% - 100%	A	60% - 69.9999…%	D
80% - 89.9999…%	B	<60%	F
70% - 79.9999…%	C		

Any or none of these borders may be moved at my discretion at the end of the semester. ***There will be no curve!*** First, there are not enough students to have a curve; you need at least 100 students to have any type of bell curve. Second, your grade in this class should ***not*** depend on the students who are in the class with you.

Distribution of points in the course

During the course of this semester, you will have 4 – 90 minute mid-term exams that are worth 150 points each (600 points total). There will also be 24 daily quizzes worth 5 points each (120 points total) that may cover that day's or a previous day's material. The final exam is worth 300 points. The labs are worth a total of 791 points. Your Reading Journal is worth 200 points (50 points at each exam). The MasteringChemistry™ assignments will be worth 400 points. If ½ of your final exam score is greater than the least of your mid-term exam scores it will replace the least mid-term exam score.

Exams	600
Quizzes	120
Laboratory	791
MasteringChemistry™	400
Reading Journal	200
Final exam	300
Total	2411

Final Exam

The final exam for this class is on Wednesday, 3 June 2015 at 10:30 a.m. No make-up finals will be given after this date. **You should start studying for your final exam today!**

NOTE: If you stop attending a class (or wish to drop a class) on or before February 22, 2015 for Spring Semester 2015, you must drop the class yourself – officially – over the Internet. Failure to do so may result in a grade of "F" in that class.

Cheating

Cheating, representing someone else's work as your own or using materials or references that are not allowed, will not be tolerated. Students caught cheating will receive a zero for that assignment and will be referred to the Dean of Instruction. If you feel the need to cheat, please do not take this class. Please refer to the Student Code of Conduct in the college catalog.

Attendance

You are expected to attend all class sessions. If you miss more than the equivalent of a week of classes without a valid excuse (illness, etc.) you will be excluded from the class.

Cell Phones

No cell phones will be on while class in session. If your cell phone rings during class you will be required to leave the class and this will count towards the week of absences as described above.

What is expected of you…

- This is a **college** level course. As such, it requires 2-3 hours of work outside of class for every hour in class. This class meets approximately 10 hours a week so you need to study at least 20 to 30 hours a week outside of class (this is a minimum, you will require more time if you are having difficulty with the material).
- I expect the students in my class to put forth the effort required for them to learn the material. I am here to ***help*** you learn the material. I cannot and will not learn it for you.
- I expect you to ask me any questions you have or to further explain what it is you don't understand.
- I expect you to use the office hours to your advantage. I have office hours scheduled (see the first page) so that you can have the opportunity to ask me questions outside of class. You can also ask questions during lab periods and via e-mail.
- I expect you to do the suggested study problems listed at the end of this syllabus. If you do not do all of the suggested problems, you cannot expect to do well on the exams. See also the explanation of the method for studying with the suggested problems at the top of that page.
- I expect you to treat me and the other students in this class with respect.
- I expect you to follow the rules set forth in this class and on this campus.

What you can expect from me…

- You can expect me to do the best I can to explain the material to you. If you do not understand it the way I am presenting it, challenge me to use my creativity to explain it in a different way so that you do understand it.
- You can expect me to be clear in what my grading policies are. They are laid out for you in this syllabus.
- You can expect me to get assignments graded and back to you in a timely manner. I will try to get them back to you within a week.
- You can expect me to be fair in grading your assignments. If you think something is unfair, ask me about it and I will explain my reasoning to you.
- You can expect me to treat you with respect. If I appear to be disrespectful to you, let me know so I can rectify the problem.

If you are a student with a disability requiring classroom accommodations, and have not contacted SSD (Service for Students with Disabilities), do so in a timely manner. SSD is located in the Student Services Annex, Room 175 or call SSD at (818) 947-2681 or TTD (818) 947-2680 to meet with a SSD counselor. If SSD has already sent the memo to me confirming accommodations required by student for this class, please meet with me to discuss arrangements.

"All mankind are chemists from their cradles to their graves… The Material Universe is a chemical experiment."
- John Adams

Reading Journal

You should make the most of your textbook; you paid a lot of money for it. Some ways to get the most out of it include reading the text, working the recommended end-of-chapter problems and using the end-of-chapter study guides. My former students will tell you that you have to read the book and you have to work the problems (especially the suggested ones at the end of this document).

Keeping a journal may be a new (to you) approach to reading your textbook. Buy a 100-page composition notebook and divide the book into three sections. Use roughly half the notebook for section one and then divide the other half about equally. Set aside a couple of pages at the very front for a table of contents. Use one of the smaller sections to keep a vocabulary list; use the other smaller section for a list of equations. As for the big section, this is your Reading Journal.

This is how to read a chemistry text book. You probably already know that a chemistry text is not the same as a history text and you definitely can't read it like you would your favorite novel. Before you begin to read a new chapter do the following:

- Look at the chapter outline on the first page of each chapter to get an idea of the major topics the chapter covers.
- Flip through the chapter page-by-page looking at the section labels which should be the same as in the chapter outline, the figures and the figure legends. Read the figure legends.
- When you get to the end, briefly study the "Chapter Perspective" noting in particular the Concepts that you should understand and Skills that you should master by the time you finish studying the chapter. This should give you a good idea of what to look for while you are reading.
- For your very first entry make a list of your personal goals for this course. Check them throughout the semester; just to see if you are staying on track with what you set out to do.
- The entries that follow will be your "reading notes". Begin a new page in your Reading Journal. Make sure you have some label to show which chapter the notes refer to.
    - After skimming the chapter you should be able to sketch an outline of your own. Write your outline in the Reading Journal.
    - As you read the first section write a one-sentence summary of each paragraph. When you finish the section, write a single sentence that summarizes the whole.
    - Remember that equations, data tables, graphs, figures and most pictures are almost always related to the words in the paragraphs on the same page. So for each equation, data table, graph, figure or picture, write a sentence or two that explains how it is related to the text.
    - As you begin to read the second section, do the same. Keep doing this for each section.
    - When you finish the whole chapter, write a brief paragraph summary. Please do not paraphrase the section summary!
    - A word of advice, this Reading Journal will be more beneficial if you write your own paragraph (in your own words summarizing what you thought was most important) than if you copy or paraphrase the section summaries found in the text.
    - Make a habit of reading a bit each day and record your entries as you go (daily or weekly). DO NOT wait until the night before it's due; it is not time well-spent and will defeat the purpose of the journal.
- As your last entry, assess how well you met your goals. At the end of the term you should have 11 entries, one for each chapter, plus your goals and self-assessment.
- Create a section in your Reading Journal where you keep a list of vocabulary words.
- Set aside a few pages for a list of important formulas.

I will collect your journals at each exam, skim them for completeness and assign points (a total of 50 points each time) for each entry!

Exams

1. The first exam covers chapters 13 through 14 and will be on Wednesday, 4 March 2015. You will be expected to be able to:
    - Solve for the rate law from a set of initial conditions
    - Solve for a rate constant, temperature or the activation energy under given conditions.
    - Utilize the integrated rate law to solve for final concentration, time or half-life.
    - Determine the rate law from a given mechanism.
    - Solve for an equilibrium constant from conditions at equilibrium
    - Solve for equilibrium concentrations from initial conditions and the equilibrium constant
    - Determine the change in equilibrium from Le Châtelier's principle
2. The second exam covers chapters 15 through 16 and will be on Wednesday, 1 April 2015. You will be expected to be able to:
    - Calculate the pH and pOH of a solution of a strong acid or base
    - Determine if a solution is acidic or basic given the pH or the hydronium ion concentration.
    - Determine if one acid is stronger than another from molecular structure
    - Demonstrate a knowledge of different acid/base definitions
    - Determine the pH and pOH of a solution of a weak acids or bases or their salts
    - Determine if a solution is a buffer and calculate its pH
    - Demonstrate a knowledge of the various regions and points on a titration curve and calculate the pH at a given point
    - Solve for the molar solubility of slightly soluble compounds
    - Solve for the solubility of slightly soluble compounds in g/100 mL of water
    - Solve for the solubility of slightly soluble compound in the presence of a common ion
    - Solve for the solubility under acidic or basic conditions
    - Solve for the equilibrium concentration of a metal ion in the presence of a complexing agent
    - Solve for equilibrium concentrations in a combination of solubility and complex ion formation
3. The second exam covers chapters 17 through 18 and will be on Wednesday, 6 May 2015. You will be expected to be able to:
    - Determine the minimum entropy change for a chemical process
    - Calculate the free energy change for a reaction
    - Determine if a reaction is spontaneous at a given temperature
    - Determine the temperature at which a reaction becomes spontaneous
    - Calculate the thermodynamic equilibrium constant for a reaction and equilibrium quantities
    - Determine the cell potential of a reaction
    - Write the cell notation of an electrochemical cell
    - Determine the thermodynamic equilibrium constant of an electrochemical cell and equilibrium quantities
    - Determine the cell potential of a reaction under non-standard conditions
    - Calculate the current, the time needed to produce a given amount of metal or the amount of metal produced in an electrolytic cell
4. The fourth exam will cover chapters 19 and 24 and will be on Wednesday, 27 May 2015. You will be expected to be able to:
    - Write a balanced nuclear equation for alpha, beta and positron emission and electron capture
    - Determine the type of decay expected for a given isotope
    - Calculate the activity of an isotope given the mass & *vice versa*
    - Determine the mass of an isotope remaining after a given amount of time & *vice versa*
    - Determine the energetics involved in nuclear processes.
    - Name transition metal coordination complexes and complex ions.
    - Write formulas for transition metal complexes and complex ions.
    - Determine the geometry and hybridization of complexes and complex ions given the magnetism or color.
    - Determine the magnetism of complexes and complex ions given their geometry.
    - Determine whether or not a complex or complex ion has optical isomers (enantiomers).

Lecture and Laboratory Schedule for Chemistry 102, Spring 2015

Week of	Lecture Chapters	Quizzes and Holidays	Monday/Tuesday Lab	Wednesday/Thursday Lab
9 Feb	13 & 14		Lecture	Check In (5 pts)
16	14 & 15	***Monday Holiday*** 20th last day to add	***Monday Holiday*** Tuesday Lecture	Factors of Kinetics (20 pts)
23	15	22th **L**ast **D**ay **T**o **D**rop (LDTD) w/o fees or getting a "W"	Chemical Kinetics (46 pts)	Le Châtelier's Principle (42 pts)
2 Mar	16	***Wednesday, Exam 1***	Lecture	Weak Acids & Bases (40 pts)
9	16		Buffers & pH (36 pts)	Acid/Base Equilibrium Problems (50 pts)
16	16		Determination of K_a by pH Titration (52 pts)	Solubility Investigation (31 pts)
23	16		Determination of K_{sp} by Iodometric Titration (34 pts)	Determination of K_f by Spectroscopy (65 points)
30	17	***Wednesday, Exam 2*** ***Tuesday Holiday***	Monday Lecture ***Tuesday Holiday***	Lecture
6 Apr	***Spring Break***			
13	17		K_{sp}, $\Delta G°$, $\Delta H°$, and $\Delta S°$ of KNO_3 Solubility (40 pts)	Determination of Percent Oxalate by Oxidation-Reduction Titration
20	18		Determination of Percent Oxalate by Oxidation-Reduction Titration	Determination of Percent Oxalate by Oxidation-Reduction Titration (64 pts)
27	18 & 19		Electrochemistry	Electrochemistry (55 pts)
4 May	19	***Wednesday, Exam 3***	Determination of Molar Mass of Lead by Electrolysis (25 pts)	Determination of the Half-life of ^{40}K (35 pts)
11	19 & 24	10th LDTD w/ a "W"	Equilibrium Between Two Co^{2+} Complexes (50 pts)	Synthesis and Analysis of a Ni^{2+} Complex
18	24		Synthesis and Analysis of a Ni^{2+} Complex (66 pts)	Molecular Models of Transition Metal Complexes (30 pts)
25	Review	***Wednesday, Exam 4*** ***Monday Holiday***	***Monday Holiday*** Tuesday Lecture	Clean Locker & Check Out (5 pts)
Final Exam—Wednesday, 3 June 2014, 10:30 a.m.				

The capacity to learn is a gift
The ability to learn is a skill.
The willingness to learn is a choice.

Laboratory Work

The laboratory work for this class is worth a total of 791 points of your overall grade (see lab schedule). In the laboratory, when any lab work is being performed, everyone is expected to wear eye protection. If I have to remind anyone of this rule more than twice in a given lab period they will be removed from the lab with the loss of points for that lab. ***You are expected to come to lab prepared.*** This means that you are to have read the introduction to the lab and the directions for the lab. If you have any questions about the lab, feel free to ask me. ***Do not ask me what you are supposed to do in the lab.*** That is why you have a lab manual. I will, however, answer any questions clarifying the instructions in the lab manual. Labs are due at the beginning of the next lab period when you walk in. Late labs will be accepted with a loss of points according to the following schedule:

Late on day due	–50% of report value
After day due	No Credit

If you are going to miss class on the day that a lab is due, make sure that you e-mail me your lab before class starts.

CHEMISTRY 102 – SECTIONS COVERED AND SUGGESTED STUDY PROBLEMS FROM TEXT

Chemistry 102 is the third class in the three semester (Chem 68, 101, 102) series. Students are expected to come into Chemistry 102 with a solid foundation in Algebra, Geometry and the first semester of General Chemistry. There will be no in-class review on material from Chapters 1-12 of the Tro text. However, many of the topics covered in Chemistry 102 require skills in the topics covered in those chapters and students must take responsibility to review as much as is necessary to relearn the material needed.

You should always do enough "Practice" problems from each assigned section to learn that type of problem. Then use the suggested "General" and "Cumulative" problems from this list as a test for yourself. Select 6 or 7 of these problems and sit down with your calculator, periodic table, any tables that are provided for the exam, your 3"x5" index card and your pen or pencil. Set a timer for 90 minutes and work out the problems. Stop working when the timer goes off. Check to see how well you did to get an idea of how you might do on the actual exam. At least one problem on each midterm and the final exam will be taken from these questions.

Exam 1

Chapter 13:	All sections — 83, 87, 89, 93, 97, 103
Chapter 14:	All sections — 73, 75, 83, 85, 87, 91, 93, 95, 99

Exam 2

Chapter 15:	All sections — 131, 135, 137, 141, 143, 145, 151, 153, 155
Chapter 16:	All sections — 113, 115, 119, 121, 123, 125, 129, 131, 135, 141, 143, 147

Exam 3

Chapter 17:	All sections — 81, 85, 93, 97, 103
Chapter 18:	All sections plus redox section in lab manual — 103, 109, 113, 115, 117, 121, 129, 131, 135

Exam 4

Chapter 19:	All sections except 19.11 and 19.12 — 77, 79, 83, 85, 87, 89, 93, 97, 103
Chapter 24:	All sections plus nomenclature section in lab manual — 57, 59, 63, 65, 67, 69, 77

Final Exam

Cumulative: Chapters 13-19 and 24

Declaration of Understanding

I hereby declare that I have read the syllabus for this class and understand the rules of this class. I also understand that any failure on my part to follow the rules of this class will result in the above mentioned penalties.

Print Name	Sign Name	
	Chemistry 102	
Date	Class	Section #
E-mail address (required in order to receive grade updates)		

** Failure to complete and turn in this page by 18 February 2015 will result in a deduction of 20 points from your overall grade. These points are forfeit and cannot be made up at a later time. **