

CHEM 162 - GENERAL CHEMISTRY II( 3 credits)

JUNE 2014

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**Office Hours** to TBA; **also by appointment.**

**Textbook** - "CHEMISTRY" by McMurry and Fay, sixth edition - Prentice Hall

"**Handouts**" may be give out at various times during the term.

**Check** your Drexel e-mail all during the term for electronic handouts.

**Place and time:** Cat 268; Thursday 6:30 -9:20 PM

**Prerequisites:** CHEM 161 or equavilent and basic algebra

The **objective** of this course is for students to learn 1) different way of expressing concentration of solute in solution, 2) some basic principles of colligative properties of solutions (freezing point depression, boiling point elevation, osmotic pressure), 3) vapor pressure of solutions (Rauolt's Law), 4), ways of expressing concentration, equilibrium, 5) how to solve for equilibrium concentrations, 6) Le Chatelier's principle and factors affecting equilibrium reaction, 7) acids and base theory, 8) calculate pH of solutions, 9) solubility products constants calculation for concentrations, 10) buffer solution and their pH, 11) oxidation and reduction reactions, 12) electrochemistry of voltaic cell and voltage calculations, 13) electrolytic production of chemicals like aluminum, 14) to relate some of these principles to industry and every day live, and 15) an introduction to some classes of organic compounds.

The **description** of this course is give my the topics which are listed below for each chapter. It is a continuation of General Chemistry I.

**Exams 1 and 2 are 1 hour each and there will be lecture for the remainder of the class.**

**Exam 1- Thursday July 24** (subject to change). The material covered will be announced in class. (it will most likely cover all lecture notes, in the textbook pages 84 to 88 of chapter 3, all of chapter 11 and all of chapter 13 subject to change). **(always check you Drexel e-mail)**. Exam 1 is 25 % of your grade.

**Exam 2- Thursday Aug. 21.** The material covered will be announced in class. (all from the end of the first exam. It will most likely cover lectures notes, pages 88 to 90 of chapter 3, pages 114-116 of chapter 4, all of chapter 14, all of chapter 15, and all or part of chapter 17 ), It is 25 % of your grade.

**Final Exam- Thursday September 4 at 6:30 PM:** It covers the **complete term** and is **50 %** of your grade.

**The exams will cover all lecture material, handouts (or mails) and material from the text book.**

For your Final grade: Exams 1 and 2 count 25% each and the final exams counts 50%.

Tentative grading scheme A+ = above 95 A = 90 to 95 A- = 88 to 90 B+ = 82 to 88 B = 75 to 82 B- = 70 to 75 C+ = 64 to 70 C = 60 to 64 C- = 56 to 60 D+ = 53 to 56 D = 50 to 53 F = below 50. You must also take all exams to pass.

You may not use alpha-numeric programmable calculators, cell phones and translators for the exams. You may use calculators which are not programmable for the exams. Remove any papers or notes from your calculator case. You are not allowed to use any notes or other material during the exam. You must learn and understand formulas.

Cheating on exams will result in failure. Cheating will be reported to the proper offices at Drexel

**You may not leave the exam room and return. Hand in your exam before you leave.**

There is no extra credit work for this course.

Missed Exam, You are expected to attend the exams as scheduled. A make up exam will be given but you must contact me immediately when an exam is missed. You should try to e-mail or call me and leave a message **before** the exam is missed if possible. If a make up exam is given, you must make arrangements with me for a time and place for the make up exam. In any case you must e-mail and call me for arrangements. If possible, the make up should be taken within 6 days of the missed exam (before the next Thursday after the missed exam) unless I agree to some other time. A make up exam will not be given for a poor grade on an exam.

The last day to drop from this course with an advisor's help is Monday July 7, 2014 before the offices close and if you do not need your advisor's permission by using Drexel One on-line Monday July 7, 2014 before 11:00 PM. (see **below additional information**)

**The last day to withdraw from this course** with an advisor's help is August 8, 2014 before the offices close.  
(see **below additional information on withdrawing from the course**)

All above and below: Subject to change (any changes will be given in lecture or e-mail)

**Class attendance is expected.**

The main **Topics** are listed below. **However** the material covered is not limited to these topics and other will be added in class. **Entire chapters** will be covered with some exceptions (for chapters which are not covered completely page numbers are given). The classes will have both **lecture** and **problem solving**.

**Problems** are at the end of the chapter. **At the least do the underlined ones.** Problems in ( ) are optional. **Complete chapter are covered when pages are not listed below.**

Chapter 3 Molarity - pages 88 to 92 Problems 84a 88 92

Chapter 4 - pages 112 solubility rules table 4.2

Chapter 11 Solutions and units of concentration, Henry's Law, Raoult's Law, boiling and freezing point changes, osmotic pressure, molar mass  
Problems 48 54b 49a 58b 59 66 70 80 82 88 96a 106 (84 108)

Chapter 13 Equilibrium, equilibrium expressions  $K_c$  and  $K_p$ , use and math solutions of  $K$  expressions, reaction quotients  $Q$ , Le Chatelier's principle and factors affecting equilibrium  
Problems (26) 58abcd 40ab 42a 44 46 48 50 (52) 54 60 61 64 70 82 84 98 80abcd 86 88

Chapter 14 Acids and bases, theory (Arrhenius, Bronsted-Lowry, and Lewis definitions), conjugate acids and bases, both strong and weak acids and bases including their differences, self ionization (dissociation) of water, pH scale, equilibrium expressions for  $K_w$ ,  $K_a$ ,  $K_b$ , and their relationship, calculation of pH of both strong and weak acid and base solutions, math solutions of  $K_a$  and  $K_b$  for hydronium or hydroxide ions, % dissociation of weak acids and bases, polyprotic acids, salts (neutral, acidic and basic ones -a handout will be given) and calculation of their pH, factors affecting acid and base strength  
Problems 48ab 50 54ab 58ab 60a(b) 66 66ab 76 70 72a (84) 82ac 88a 94abc 89b 90abc 93abcd(ef) 96 98abc 100ab (126) additional problem: Calculate the pH and the % dissociation of a 0.2 M solution of trimethyl amine in water see appendix C table C.3

Chapter 3 Titration and calculation of molarity - pages 92 titration to 94 bottom  
Problem 94 97

Chapter 4 - pages 120-121 Acid and base neutralization reaction and equations  
Problems 58ab 60ab

Chapter 15 Acids and bases, buffers, Solubility Product Constants  $K_{sp}$ , neutralization, buffer solutions and calculation of their pH using the Henderson-Hasselbalch equation, titration calculations, titration curves for both strong and weak acids, Solubility product equilibrium, calculations of  $K_{sp}$  and uses, common ion effect  
Problem 42 125ab 44 (52) 60abcd calculate the  $pK_a$  for HOCl see appendix 72 Calculate the concentration of  $H_2SO_4$  (sulfuric acid) solution from the following titration: 25 mL of the acid was titrated by 44.69 mL of NaOH whose molarity is 0.1372 M. 88ac 90abc 96ab 92 100 see (appendix C) (112 64) 76 113

Chapter 17 Electrochemistry, oxidation and reduction reactions, Voltaic cells (Galvanic cells--batteries) and their description, shorthand notation for cells, conventions of tables for voltages, calculation of voltage of batteries (cell potential) using standard reduction potential reduction tables, use of Nernst Equation, cathodic protection of metals; Electrolytic cells, preparation of metals and other elements by electrolysis, electroplating, stoichiometric calculation in electrochemical cells, relationships between amps, time, number of coulomb  
38a 40a 46a 48 (55) 58 66a(b) 68a(bcd) 72 74 (89 96) 104 106 112a (read only--120, 128 and 130)

All or part of the following may be covered. It depends upon the time remaining.

Chapter 23 Organic Chemistry learn names in table 23.2; pages 908 to 926, 927 bottom --- Dacron, 931 top nylon 66, and 947; Alkanes and isomers, Alkenes (cis and trans geometric isomers, alkynes, alkyl halides, aromatics, nomenclature of these compounds, some reactions of these classes such as combustion and halogenation, hydrogenation of alkenes, polymerization of alkenes---polyethylene, polypropylene, Teflon, PVC--- see **lecture notes**

Problems 50acdb 52bc(ad) 53ab 58 59a 60 62

---- addition material may be added from this chapter such as alcohols pages 958 to 959 Problem 82ab

All above--Subject to change (announcements in class or by e-mail). Additional material may be added.

### **Additional Information**

The last day to drop from this course with an advisor's help is **July 7, 2014** before the offices close and if you do not need your advisor's permission by using Drexel One on-line July 7, 2014 before 11:00 PM this term. (see below)

The last day to withdraw from this course with an advisor's help is **August 8, 2014** Friday before the offices closes. (see below)

**Before you drop or withdraw from a course you should check with your advisor as there may be consequences.** Dropping or withdrawing from a course may affect your academic standing or your financial situation. It may have serious effect on billing at Drexel, financial aid, VA benefits, NCAA athletic eligibility, immigration status for foreign students, and other possible consequences. As a student you are responsible for transactions against your academic record. <http://www.drexel.edu/provost/policies>  
<http://www.drexel.edu/src/financialaid/info/eligibility>  
**Office of International Students and Scholar Services (ISSS)**  
[http://www.drexel.edu/studentlife/get\\_involved/international\\_students\\_scholars/](http://www.drexel.edu/studentlife/get_involved/international_students_scholars/)  
<http://www.drexel.edu/src/about/veterans>

**If you register for a course**, your responsibility is to complete the course, drop it, or withdraw from the course. If you register for a course and do not complete it, drop or withdraw from the course, eventually a NGR grade will turn to a failing grade of F. You may be given an F immediately at the term's end. Different policies apply to dropping a course and withdrawing from a course (Dropping a course results in the course being removed from your transcript. Withdrawing from a course results in a grade of W on your transcript for that course). Student should consult their Advisors (both academic and financial Aid Advisors) and in some cases the instructor before dropping or withdrawing from the course.

**In order to drop or withdraw from a course**, you should have the "Add/Drop/Withdraw" form signed

by the course instructor and the student's Academic Advisor. Dropping or withdrawing from the course may affect your billing and academic record (follow procedures and consults Advisors. See above). Forms are available in many Department offices, in the lobby of Goodwin College and at <http://www.drexel.edu/src/forms>

<http://www.drexel.edu/drexelcentral/courses/adjustments/course-withdraw/>

See also [http://www.drexel.edu/provost/policies/course\\_drop.asp](http://www.drexel.edu/provost/policies/course_drop.asp)

see "Course Withdrawal Policy", "Course Drop Policy", "Code of Conduct", and other important information at <http://www.drexel.edu/provost/policies> and <http://www.drexel.edu/provost/>

**Incomplete grade "I" or No grade reported or No-Credit.** You must take responsibility to meet the University's policies and deadlines for requesting an incomplete grade and completing a course before the deadline passes. If a student stops attending a course, you are not automatically removed from the course.

Your responsibility is to complete the course, drop it, or withdraw from the course. If you register for a course and do complete it, drop or withdraw, eventually an NGR (no grade reported) grade will turn to a failing grade F. An Incomplete grade "I" will turn to an F (failure) grade if the student does not complete the course. see <http://www.drexel.edu/provost/policies/grades.asp>

**If a student has an Incomplete grade or a No Grade Reported,** the student should see the instructor for the course and the student's Academic Advisor **immediately,**

**If you do not meet your financial obligations to the University do not expect a grade from the University and from the instructor.**

Please read the "Academic Honesty Policy in the student Handbook at [http://www.drexel.edu/studentlife/community\\_standards/studentHandbook](http://www.drexel.edu/studentlife/community_standards/studentHandbook) See also: [http://www.drexel.edu/provost/policies/academic\\_dishonesty.asp](http://www.drexel.edu/provost/policies/academic_dishonesty.asp)

[http://www.drexel.edu/studentaffairs/community\\_standards/overview/](http://www.drexel.edu/studentaffairs/community_standards/overview/)

Students are expected to follow these policies. The handbook also explains policies for dealing with cheating and other forms of academic dishonesty.

Read about Academic Integrity, Plagiarism and other topics at

[http://www.drexel.edu/studentaffairs/community\\_standards/studentHandbook/general\\_information/code\\_of\\_conduct/](http://www.drexel.edu/studentaffairs/community_standards/studentHandbook/general_information/code_of_conduct/)

[http://www.drexel.edu/studentaffairs/community\\_standards/studentHandbook/general\\_information/](http://www.drexel.edu/studentaffairs/community_standards/studentHandbook/general_information/)

**For the "Americans with Disabilities Act" Drexel University has the "Office of Disability Services at 3201 Arch Street, Suit 210 and online. <http://www.drexel.edu/oed/policies>**

<http://www.drexel.edu/oed/disabilityResources>

<http://www.drexel.edu/oed/disabilityResources/students/>

This office is to be contacted by the student if special course accommodations, emergency medical information or building evacuations are need. This office will also verify any special needs and give a form to the student to give to the instructor. The student should make the arrangements with this office and inform the instructor within the first two weeks of the term or when a new situation occurs.