**CHEM 0107**

**Advanced General Chemistry**

**Fall, 2014**

Course description:

This course is a one-semester alternative to one year of general chemistry (CHEM 0103 and CHEM 0104). It is open to all students who have received a 4 or 5 on the Advanced Placement test in Chemistry. Students who have two or more years of high school chemistry without AP credit may enroll with permission of the instructor. Topics will be drawn from the traditional general chemistry curriculum, but discussed in greater detail with a more thorough mathematical treatment. Special emphasis will be placed on chemical bonding, coordination chemistry, and real world research in chemistry. (AP Chemistry or equivalent.) 3 hrs. lect., 3 hrs. lab, 1 hr. dis. (Approval required) **DED SCI** (S. Choi, Y. Kim).

Instructors:

for Lecture: **Professor** Sunhee **Choi** (MBH 544, choi@middlebury.edu)

for Pre-Lab Discussion and Lab: **Dr.** Young Hie **Kim** (MBH 513, younghie@middlebury.edu)

Meeting Times:: Lecture : TR 9:30 - 10:45 AM MBH 303

Discussion: W 8-8:50 AM MBH 303 Laboratory : W or R 1:30 -4:15 pm MBH 560

Office Hour: MWF 11:00 - 12:30

Textbook: *Chemical Principles The Quest for Insight* by Atkins and Jones, 6th ed, Freeman, 2013.

Required activities:

**1. Attendance, Reading and Participation**: Regular attendance is expected. Reading the assigned material in your textbook before class will be essential for your mastery of the concepts that will be discussed in class. Class discussion is an essential part of this course, and the extent of your participation can change your final grade.

**2. Homework problem sets**: There will be a weekly HW assignment, which is due a week after it is assigned. Late homework will not be accepted, and counts as a zero.

**3. Exams**: 1st Exam Oct. 27 (M), 7 - 10 PM (**MBH 303 and 309**)

2nd Exam Dec. 12 (F), 7 - 10 PM (**MBH 303 and 309)**

Determination of Final Grades:

HW 25%

1st Exam 25%

2nd Exam 25%

Laboratory 25% You must finish all the required experiments to pass this course.

CHEM 0107 (Fall, 2014) Tentative Schedule

Instructors: Prof. Choi and Dr. Kim

**M TU W TH F**

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| --- | --- | --- | --- | --- | --- |
| **W1** | 9/8 | **9/9 Day 1**  **Introduction**  **Kinetics**  **(Ch. 15)** | **9/10**  **Introduction**  **Exp. 0.**  **Lab Safety** | **9/11 Day 2**  **Kinetics**  **(Ch. 15)** | 9/12 |
| **W2** | 9/15 | **9/16 Day 3**  **Thermodynamics**  **(Ch. 8, 9)** | **9/17**  **Exp. I.**  **Kinetics** | **9/18 Day 4**  **Chemical Equilibria**  **(Ch. 11)** | 9/19 |
| **W3** | 9/22 | **9/23 Day 5**  **Chemical Equilibria**  **(Ch. 11)** | **9/24**  **Exp. II.**  **Qualitative Analysis** | **9/25 Day 6**  **Solubility**  **(Ch. 13: 13-8, 13-9)** | 9/26 |
| **W4** | 9/29 | **9/30 Day 7**  **Acids and Bases**  **(Ch. 12)** | **10/1**  **Exp. II.**  **Qualitative Analysis** | **10/2 Day 8**  **Acids and Bases**  **(Ch. 12)** | 10/3 |
| **W5** | 10/6 | **10/7 Day 9**  **Buffer**  **(Ch. 13)** | **10/8**  **Exp. III.**  **Acid/Base** | **10/9 Day 10**  **Buffer**  **(Ch. 13)** | 10/10 |
| **W6** | 10/13  Mid-Term  Recess | 10/14  Mid-Term recess | **10/15**  **Exp. III.**  **Acid/Base** | **10/16 Day 11**  **Electrochemistry**  **(Ch. 14)** | 10/17 |
| **W6.5** | 10/20 | 10/21 **Day 12**  **Electrochemistry**  **(Ch. 14)** | **10/22**  **Exp. IV.**  **Voltaic Cell** | **10/23 Day 13**  **Electrochemistry**  **(Ch. 14)** | 10/25 |
| **W7.5** | **10/27**  **1st Exam**  **7-10 PM** | **10/28 D14**  **Atoms:**  **The Quantum Theory**  **(Ch. 1)** | **10/29**  **Exp. V.**  **Vanadium Lab** | **10/30 D15**  **Atoms:**  **The Quantum Theory**  **(Ch. 1)** | 10/31 |
| **W8.5** | 11/3 | **11/4 D16**  **Atomic Structure**  **(Ch. 2)** | **11/5**  **Exp. VI.**  **Cobalt Complex** | **11/6 D17**  **Atomic Structure**  **(Ch. 2)** | 11/7 |
| **W9.5** | 11/10 | **11/11 D18**  **Bonding I**  **(Ch. 3)** | **11/12**  **Exp. VI.**  **Cobalt Complex** | **11/13 D19**  **Bonding I**  **(Ch. 4)** | 11/14 |
| **W10.5** | 11/17 | **11/18 D20**  **Bonding II**  **(Ch. 4)** | **11/19**  **Exp. VI.**  **Cobalt Complex** | **11/20 Day 21**  **Bonding II**  **(Ch. 4)** | 11/21 |
| **W11.5** | 11/24 | **11/25 D22**  **Bonding II**  **(Ch. 4)** | 11/26  Thanksgiving | 11/27  Thanksgiving | 11/28  Thanks |
| **W12** | 12/1 | **12/2 D23**  **Bonding III**  **Coordinate Covalent Bond**  **(Ch. 17)** | **12/3**  **Check-out** | **12/4 D24**  **Bonding III**  **Coordinate Covalent Bond**  **(Ch. 17)** | 12/5 |
| **E**  **X**  **A**  **M** | 12/8  Exam Period  Begins | 12/9  EXAM | 12/10  PERIOD | 12/11 | **12/12**  **2nd Exam**  **7-10 PM** |