CHEC 353 – PHYSICAL CHEMISTRY AND APPLICATIONS III
WINTER, 2007

Course Objective: This is a four-credit course covering select topics from the areas of chemical kinetics, optical spectroscopy, and surface chemistry. In addition to the material included in the textbook, several examples of the application of lecture topics to “real world” situations will be presented.

Prerequisite: CHEC 352 or equivalent

Instructors: Dr. Daniel King
Office: Disque 509 Tel: (215) 895-0571
Email: daniel.king@drexel.edu
Office hours: Mon 3-5; Tues 10-12; Thurs 1-3


Meeting Times/Locations: Monday, Wednesday 1:00 – 1:50 in Curtis 341
                    Friday 1:00 – 2:50 in Randell 231

Website: The official course website will be located on WebCT, accessible through your Drexel One account (“My Courses” link), or directly, through the following website: http://webct.drexel.edu. Please check this site frequently as important information will be posted on a regular basis.

Classroom etiquette: Once the class has begun, I will expect to have your full attention. Make sure that your cell phone is turned off during class. If I catch you text-messaging during class, I reserve the right to ask you to leave.

Disability Services: Students with disabilities who wish to request accommodations and services at Drexel University need to present a current accommodation verification letter (“AVL”) to the instructor before accommodations can be made. AVL’s are issued by the Office of Disability Services (“ODS”); http://www.drexel.edu/oed/disability/Students/index.html.

Cheating: While collaboration on homework is encouraged, direct copying of answers is not permitted and will result in a zero for that assignment. Any cheating during an exam will result in a score of zero for the exam. More serious or repeated offenses will be reported to the University.
Grading:

- Exam 1 (20%) – end of 4th week (tentative date)
- Exam 2 (20%) – end of 7th week (tentative date)
- Final Exam (30%) – cumulative (during Finals Week)
- Homework (15%) – due in Disque 509 by 5 PM on Friday each week. Each assignment will be graded on a 10-point scale: 5 points for completion of all problems and 5 points for 1 randomly selected problem. Late homework must be turned in by 5 PM Monday, and will not be accepted after that time. 3 points (of the 10) will be deducted from late homework. You must show your work, not just the final answer.

- One-page reports (10%) – three short reports will be due throughout the term. For each report, briefly summarize a research article that involves a technique discussed in class or the textbook.
  - Monday, 1/29: kinetics report
  - Monday, 2/19: spectroscopy report
  - Monday, 3/12: surface chemistry report

- Participation (5%) – There will be three, equally weighted components to your participation grade. (1) Each student will be assigned a personal response device ("clicker") to use this term. Full credit will be given for responses to at least 75% of the questions asked during the course of the term. Your grade will NOT be based on the correctness of your answers; only that you submit an answer. (2) Most weeks you will spend some time working in groups. You are expected to be an active participant in your group. The instructor will be the primary evaluator of this participation; however each group will have a student evaluator who will provide input regarding the participation of each group member. (3) A discussion board will be accessible on the WebCT website for this class. Each student must submit 3 posts to the discussion board over the course of the term. Posts may include questions about a homework problem or something covered in class, answers to someone’s previously posted question, or tips for answering a homework problem. Each post must include a complete and unique thought; simple agreement with a previous posting will not count to your total.

Final grades will be determined according to the following scale:

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<th>Grade</th>
<th>Range</th>
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<tr>
<td>A+</td>
<td>98 – 100</td>
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<td>A</td>
<td>93 – 97</td>
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<td>A-</td>
<td>90 – 92</td>
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<td>B+</td>
<td>87 – 89</td>
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<td>B</td>
<td>83 – 86</td>
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<td>B-</td>
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<td>C+</td>
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<td>C</td>
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<td>D+</td>
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Course Schedule:

**Chapters 22, 23, 24.1 – Reaction Kinetics:**
Week 1: Rate and order of reaction. Determination of the rate equation.
Week 3: Steady-state approximation. Chain reactions.
Week 4: Catalysis. Photochemical reactions. Collision rate theory.

**Chapters 13, 14 – Optical Spectroscopy:**
Week 5: Beer’s Law. Pure rotational spectra.
Week 6: Vibration-rotational spectra. Raman spectra.
Week 7: Electronic spectra of molecules. Laser spectroscopy and fast reactions.

**Chapter 19.13-15, 25 – Surface Chemistry and Colloids:**
Week 8: Physisorption and chemisorption. Adsorption isotherms.
Week 9: Chemical reactions on surfaces.
Week 10: Colloidal systems.

1. Read the book.
   a. Don’t read much beyond what will be covered in lecture.
   b. Use first reading of material to get broad view of topic. Gain familiarity with terms, equations, and concepts presented.
   c. Don’t expect to understand everything. Don’t get hung up on a point you don’t understand.
   d. Write questions as you are reading the book.
   e. Skim notes from previous class. Mark any questions you have.

2. Attend the lecture.
   a. Pay attention.
   b. Volunteer answers.
   c. Take notes. (Some lecture notes will be available on WebCT.)
   d. Ask questions. If you are confused about something I have said, or how I got from one step to the next, ask questions during the lecture.

3. Work in groups.
   a. Go over notes with other students.
   b. Work together to solve homework problems. Make sure that you write up the solution on your own.
   c. Study for exams with other students.

4. Use Professor as resource.
   a. Know when office hours are. If you can’t come to office hours, make appointment to come other time.
      1. Formulate questions before you get to the office.
      2. Try to be as specific as possible with questions.
      3. Understand that the Professor might answer questions from more than one student at a time.
   b. Let the Professor know if you want to discuss something privately.
   c. In case of emergency, let the Professor know as soon as possible. If you might need an extension, let the Professor know as soon as possible, not after the assignment is due.
   d. Email questions when you cannot make it to the Professor’s office.