Aquatic Chemistry – CE/ESR/CH 410/510 Winter 2012
Portland State University
Portland, Oregon
T and Th.....2:00 PM to 3:50 PM
Dr. James F. Pankow  pankowj@pdx.edu

Email: keep your questions very short; for long questions, visit me during my office hours. I rarely read my D2L Messages...send email messages to above email address...I closely watch that email inbox
Office Hours: Tuesdays, 10 AM to 12 Noon
Office: Engineering Building 202D

Text: Pankow - Aquatic Chemistry Concepts/Lewis – CRC Press
TA and Grader: Marguerite Marks, margueritenw@hotmail.com  Turn in HWs to me in class or during my office hours, or at the Civil and Env. Eng. Front Desk, 2nd Floor Suite, Engineering Building to be time stamped Sample HWs and Exams scoring A, B, and C need to be scanned as part of constant accumulation of “accreditation” documentation... All names will be redacted from all scanned work. You can opt out of that if you wish.

Class Grade:  
30 Course Points HW  
30 Course Points Midterm  
40 Course Points Final  
100 Course Points  
Grading Based on Course Points (I hate giving anything lower than a C, don’t make me do it)

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<th>Grade</th>
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<tr>
<td>A</td>
<td>85–100</td>
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<td>B</td>
<td>75–84</td>
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<td>C</td>
<td>65–74</td>
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<td>D</td>
<td>55–64</td>
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Firm Late HW policy: Homeworks turned in late lose 15 points a week...E.g, if first HW is turned in on Jan 14, lose 15 points, if turned in on Jan 21, lose 30 points, and so on. (No late homeworks accepted during finals week.)

Part 1. Introduction to Acid/Base Chemistry

Reading Assignment in Text

Week 1
Jan 10  PBES, ENE, MBEs
Jan 12  Solving Acid/Base Problems - Pt 1  
Comment:  For Chapter 5 material, don’t worry about the material discussing the derivations of the lines bounding the regions in which any given “approximation equation is valid.  
Homework #1 distributed

Week 2
Jan 17  Solving Acid/Base Problems - Pt 2  
Jan 19  Solving Acid/Base Problems - Pt 3  
Activity Coefficients and Activity Corrections
Optional material that is analogous to the material covered in the previous lecture:  
91.6 – 97.7; 99.6 – 100.7 102.7 – 103
Required Material:  104 – 105, Table 2.3, 43 – 44.6
Homework #2 distributed

Week 3
Jan 24  pH as a Master Variable – Pt 1  
Jan 26  pH as a Master Variable – Pt 2  
Homework #3 distributed

Part 2. Titrations and Buffers

Week 4
Jan 31  Tittrations
Feb 02  Buffer Intensity  
Homework #4 distributed

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<tr>
<td>A</td>
<td>129 – 141</td>
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<tr>
<td>B</td>
<td>143 – 156.6</td>
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<td>C</td>
<td>118.8 – 127.6</td>
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<td>D</td>
<td>109 – 118.8</td>
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Part 3. CO₂ Chemistry

Week 5
Feb 7 CO₂ Chemistry – Pt 1  
Feb 9 CO₂ Chemistry – Pt 2  
   Homework #5 distributed

Feb 7 CO₂ Chemistry – Pt 1  
Feb 9 CO₂ Chemistry – Pt 2  
   165 – 177.4

Week 6
Feb 9 CO₂ Chemistry – Pt 2  
Feb 14 Midterm – through Feb 7  
Feb 16 CO₂ Chemistry – Pt 3  
   177.4 – 187.3 ; Eq 9-73, Fig 9.8
   Homework #5 distributed

Feb 14 Midterm – through Feb 7  
Feb 16 CO₂ Chemistry – Pt 3  
   189.7 – 198

Week 7
Part 4. Metal Carbonate MCO₃(s) Dissolution
Feb 21 MCO₃(s) Closed to a Gas Phase – Pt 1  
Feb 23 MCO₃(s) Closed to a Gas Phase – Pt 2  
   MCO₃(s) Open to a Gas Phase  
   243 – 251.3
   253.6 – 255.5
   259 – 266, 267 – 270.8, 276.5 – 278
   Homework #7 distributed

Week 8
Part 5. Redox Chemistry in Natural Waters
Feb 28 Redox – Pt 1  
Mar 01 Redox – Pt 2  
   267 – 270.8, 276.5 – 278
   Homework #8 distributed

Feb 28 Redox – Pt 1  
Mar 01 Redox – Pt 2  
   Basic Review of Redox Chemistry
   Introduction to EₚH–pH diagrams (Cl, H, and O)

Week 9
Mar 06 Redox – Pt 3  
Mar 08 Redox – Pt 4  
   EₚH–pH diagrams (Carbon)
   EₚH–pH diagrams (Nitrogen and Sulfur)
   Homework #9 distributed

Week 10
Mar 13 Redox – Pt 5  
Mar 15 Redox – Pt 6  
   Redox Succession in Natural Systems
   Review