# CHEMISTRY 208 – SUMMER 2018

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**Office hours:** Tuesday and Wednesday: 1-2 p.m.; Thursday: 11-1 (or by mutual agreement)

**Text:** Chemistry, Atoms First, Rice University, Houston TX. https://openstax.org/. There are several options for accessing the text and a solutions guide for odd number problems:

1) Download a pdf copy or view an HTML copy (FREE)
2) Purchase a hard copy (a mere $65 from Amazon)

***Links provided on the 208 Blackboard site***

We are rebelling against the high cost of traditional textbooks ($250+) by using the Openstax option. You may note that they ask for donations of $10-20 for users of the text to ensure that this option remains viable for years to come. Please contribute to bringing profiteering book publishers down to their knees.

**Blackboard:** ***General Chem II (Summer 208)***): Used extensively throughout the semester.

**Grading:** The grading for this course will tentatively be as follows:

| | | | |
|---|---|---|---|
| Problem Sets | 3 x 30 = | 90 points | (10%) |
| Exams | 3 x 170 = | 510 points | (57%) |
| Final Exam: | | 300 points | (33%) |
| ***TOTAL:*** | | ***900 points*** | |

Yeah, the percentages are a little weird, but it's just numbers. A floating grading scale will be used with the median grade as a guideline. The median grade for this course will be considered to be a very respectable B. I will let you know after each exam how the grade distribution looks throughout the semester. Tradition (past history for my courses) would imply that the grade "breakdowns" roughly follow the ranges below, with some limited +/- grades on either side of the ranges as well (the overlap implies uncertainties in year to year fluctuations of the DR R mind palace):

A 88-100 B 77-89 C 63-78 D 50 – 65 F <50

**Game Plan**: The contents of this course are a continuation of topics covered in the first semester of general chemistry at William and Mary, thus there is an expectation that those concepts have been "mastered" to a certain degree. Some topics will be reviewed as a precursor to new discussions in similar areas. We will be moving at a fairly good pace on some rather difficult concepts. Keeping up with the material, in particular, the reading and practice problem assignments, will be critical to your success in this course.

I will use OneNote for all lectures and help sessions. Transcripts (pdfs) of all lectures and help sessions will be provided on ***Blackboard*** in a timely manner after each live episode, but I assure you that class attendance can be a real plus for a successful outcome. You will most likely be harassed from time to time by emails with amended course information, corrections, weather, etc.

**Practice problems:** The problems recommended for each chapter represent a minimum effort for understanding the material and should be completed prior to attempting the graded problem sets and certainly the exams. I will try to provide some guidance at the end of lectures as to which assigned problems have been conceptually covered that day. Answers to the practice problems will be provided on ***Blackboard*** in a timely manner once the topic is completed.

**Problem sets (3/4):** These will be given after particular topics are completed in lecture (except part of Problem Set #1, which is a Gen Chem I review). You will typically have several days to complete the problem sets. You may use any resources available to you to solve the problems, including other life forms. Tentative due dates are provided in the course schedule (Page 2) of the syllabus. The lowest problem set score out of the four assigned will be dropped from your overall grade. Help sessions are scheduled prior to the due date for each problem set.

**Hour Exams (3):** The exams will typically be a mixture of multiple choice, short answer, and numerical problems. Practice exams will be provided on ***Blackboard*** for "timely" practice. Cover sheets containing pertinent equations for the test material and a periodic table will be provided for each exam and posted on ***Blackboard*** for your perusal (always liked that word). Help sessions are scheduled every Thursday after class prior to each scheduled hour exam on Friday. All exams will begin promptly at 8 a.m. on the dates scheduled and designed to last a **maximum** of 60 minutes. Lecture on those days will immediately follow the exam.

**Final Exam:** The final will be comprehensive (and hopefully comprehendible) and cover all material (problems and descriptive) presented for the entire semester. A cover sheet with pertinent information/equations will be provided for the final exam as well. I hope to have all lecture material completed a couple of days before the final exam date to allow for "absorption" time and/or for taking the final exam early if you so desire.

**Missed exams, etc**. There are no options available, regardless of the circumstances, for turning in problem sets late since one problem set is dropped from your overall grade. Rescheduling of exams due to illness or college sanctioned activities must be approved by DR R prior to the start of any hour exam. If for any reason an hour exam is not completed within an approved timeline, then the weight associated with the final exam will be increased to reflect the missed assignment(s). For example, if you miss Exam II, then the final exam will be weighted such that the total points on the final is based on 300+160=460. Thus, if your grade on the final was 250/300, that would be scaled up to be 370/460. Honestly, it would probably be in your best interest not to miss anything.

## IMPORTANT DATES

| | | |
|---|---|---|
| Thursday, July 5: 9:30 am | *HELP SESSION !* | *(ISC 1280)* |
| **Friday 7, July 6** | **PROB SET #1 DUE** | ***(at class time)*** |
| Tuesday, July 10, 1:00 pm | *HELP SESSION !* | *Place TBA* |
| **Wednesday, July 11** | **PROB SET #2 DUE** | ***(at class time)*** |
| Thursday, July 12th, 9:30 pm | *HELP SESSION !* | *(ISC 1280)* |
| **Friday, July 15 ; 8 am** ⇨ | **EXAM #1** | ***(Chapters 14-15)*** |
| Tuesday, July 17 | *HELP SESSION !* | *Place TBA* |
| **Wednesday, July 18** | **PROB SET #3 DUE** | ***(at class time)*** |
| Thursday, July 19: 9:30 am | *HELP SESSION !* | *(ISC 1280)* |
| **Friday, July 20 ; 8 am** ⇨ | **EXAM #2** | ***(Chapters 12, 16)*** |
| Tuesday, July 24; 1:00 pm | *HELP SESSION !* | *Place TBA* |
| **Wednesday, July 25** | **PROB SET #4 DUE** | ***(at class time)*** |
| Thursday, July 26; 9:30 am | *HELP SESSION !* | *(ISC 1280)* |
| **Friday, July 27 ; 8 am** ⇨ | **EXAM #3** | ***(Chapters 5, 19, 20)*** |
| Wednesday, August 1 | *HELP SESSION !* | *(TBA)* |
| Thursday, August 2 | *HELP SESSION !* | *(TBA)* |




**FRIDAY, August 3rd**
***FINAL EXAM (Comprehensive,)***

# Proposed Schedule of Tentative Topics

*(or where we should be when we get there)*

| DATE | TOPIC | READING | PRACTICE PROBLEMS |
|---|---|---|---|
| July 2 | Course introductions<br>Acid-base FUNdamentals | 14.1-14.2 | 14.4a-c, 6a-c, 10a-c, 12a-c,16, 22, 24 |
| July 3 | Acid/base strengths, $K_a$ and $K_b$ (the FUN ends) | 14.3 | 14.30, 32, 34, 36, 40a, 44, 52, 56ab, 58, 60ab, 72, 76 |
| July 4 | No Class. Come on, it's a national holiday…. | Declaration of Independence | Fireworks, watermelon, and ice cream |
| July 5 | Polyprotics; acid/base properties of salts (the nasty stuff) | 14.4–14.5 | 14.78, 80, 82 |
| July 6 | Common ion and buffers (not to be confused with buffets) | 14.6 | 14.88, 90, 02, 94, 96, 100, 104 |
| July 9 | Titrations (the ultimate acid/base problems); indicators | 14.7 | 14.114 |
| July 10 | Solubility equilibria (some things don't dissolve well); Lewis acids/bases and complex ions) | 15.1-15.2 | 15.2, 4, 8a-c, 10ab, 12, 14ab, 16ab, 20, 22, 30ab, 32, 38, 42, 54, 62, 63, 76a-c |
| July 11 | Thermodynamics (review; the heat is on) | Handout; 9.1-9.3 | 9.8, 10, 22, 30, 48, 54, 58, 62, 66, 84a |
| July 12 | Thermodynamics (chaos can be a good thing with free energy) | 12.1-12.4 | 12.12, 16, 17, 22, 28a-c, 34a-c, 36, 40ab, 44, 48 |
| **July 13 (Friday)** | **EXAM I *(Chapters 14-15)*** | | |
| July 13 | Electrochemistry (to reduce or oxidize; that is the reaction) | Handout; 16.1-16.2 | 16.4, 6, 8ab, 14, 18ab |
| July 16 | Electrochemistry (where would Google be without Nernst?) | 16.3-16.4 | 16.24ab, 26, 28, 30, 31a-c |
| July 17 | Electrochemistry (hope you have a Faraday) | 16.7 | 16.48ab, 50ab, 51 |

| DATE | TOPIC | READING | PRACTICE PROBLEMS |
|---|---|---|---|
| July 17 | Covalent bonding (let's meld Lewis and hybrid theory together) | 4.4-4.5 (*review*) | 4.51, 53, 57 |
| July 18 | Covalent bonding (the bizarre molecules); Molecular Orbital Theory (glad it isn't a law) | 5.1-5.4 | 5.29, 31, 33, 35, 47<br>15.55, 57, 59 |
| July 19 | Nuclear Chemistry (it's sooo… elemental) | 20.1-20.2 | 20.5. 8, 14, 16, 18 |
| **July 20 (Friday)** | **EXAM II *(Chapters 12,16)*** | | |
| July 20 | Nuclear Chemistry (the good/bad side of energy) | 20.3-20.4, 20.6 | 20.30, 32, 36, 68, 44, 46, 47ab, 54, 60 |
| July 23 | Transition metal chemistry (not talking heavy metal here) | Handout; 19.1 | 19.6, 8a-c, 26a-d, 32 |
| July 24 | Transition metal chemistry (d orbitals sure are complex) | 19.2-19.3 | 19.36, 38, 41a-c, 47, 48 |
| July 25 | Transition metal chemistry (the inorganic of bioinorganic) | | |
| July 26 | Descriptive Inorganic (why must you torture us so!!!) | 18.1-18.5 | 18.10, 16, 18, 28a-d, 52, 60, 74 |
| **July 27 (Friday)** | **EXAM III Chapters 5, 19, 20** | | |
| July 30 | Descriptive Inorganic (please have mercy!!!) | 18.7-18.12 | 18.83, 86, 89, 92, 105a-c, 112a-c, |
| July 31 | Descriptive Inorganic (our affairs with air); Review (ask me anything) | Handout | |
| **Aug 3 (Friday)** |  **FINAL EXAM (8-11 a.m.)**  | | |