CHEM-111 INFORMATION SHEET (Sections 020D - 025D)
Fall, 2012

Lectures: Every Monday, Wednesday and Friday, 9:05-9:55A.M., Brown Laboratory 101, Dr. John Burmeister

Discussion Sections: Every Friday, as follows:

Section	Instructor	Meeting Day/Time/Place	Instructor's Office	Instructor's Telephone #/E-mail
020D	Kaitlin Papson	F 12:20 - 1:10PM QDH 074	LDL 124	831-1197 kpapson@udel.edu
021D	Kaitlin Papson	F 1:25 - 2:15PM QDH 074	LDL 124	831-1197 kpapson@udel.edu
022D	Kaitlin Papson	F 2:30 - 3:20PM QDH 074	LDL 124	831-1197 kpapson@udel.edu
023D	Andrea Potocny	F 12:20-1:10PM CLB 109	BRL 109	831-1069 apotocny@udel.edu
024D	Andrea Potocny	F 1:25 - 2:15PM CLB 109	BRL 109	831-1069 apotocny@udel.edu
025D	Andrea Potocny	F 2:30 - 3:20PM CLB 109	BRL 109	831-1069 apotocny@udel.edu

Help Session:
A weekly help session (day, time, and place to be announced) will be supervised by each of the discussion section instructors. Each of the two UG CHEM-111 Teacher's Assistants will also hold weekly help sessions [Jennifer McCord (BS/CHEM/14), jpmccord@udel.edu; Eric Yen (BS/CHEM/14), ericyen@udel.edu]

Texts:

Chemistry and Chemical Reactivity (8th Ed.), by Kotz, Treichel, and Townsend [UD BA/85] (ISBN: 978-0-8400--4828-8).

Student Solutions Manual for CCR (8th ed.), by Banks; (ISBN: 978-1-111-42698-9)

CHEM-111 Personalized System of Instruction (2012 ed.), by Burmeister. Additional general chemistry texts, each by a different author, have been placed on reserve in the Reserved Book Room of Morris Library for your use, should you need/desire an alternative to **CCR** - see attached list.

Reading Assignments and Lecture Notes:

Background reading assignments (in *KTT*) and detailed lecture notes will be found in the eleven **CHEM-111 PSI** modules.

Problem Assignments:

Problem assignments (drawn from **KTT**, and special problem sets in the **CHEM-111 PSI**) will be found in the **CHEM-111 PSI**. Detailed answers to each of the PSI problems are given in the PSI booklet. Short answers to the questions and problems in **KTT** are given in Appendices N, O, P, Q, and R. Detailed answers to the blue numbered Study Questions in **KTT** are shown in the **Student Solutions Manual**, by Banks.

Quizzes:

Short (ca. 25 min.) quizzes will be given during the discussion section periods every week that an "hour" examination is ***not*** scheduled. Coverage will be announced on a week-to-week basis.

"Hour" Examinations:

Exam I - **Wednesday, September 26, 5:00-7:00 p.m., SMITH 140.** Material covered between August 29 and September 21, inclusive. Review session will be held on September 24, during the lecture period.

Exam II - **Wednesday, October 31, 5:00-7:00 p.m., SMITH 140.** Material covered between September 26 and October 26, inclusive. Review session will be held on October 29, during the lecture period.

Exam III - **Wednesday, December 5, 5:00-7:00 p.m., SMITH 140.** Material covered between October 31 and November 30, inclusive. Review session will be held on December 3, during the lecture period.

A four year file of past exams, with detailed answers, is included in the **CHEM-111 PSI**. The questions in these exams provide an **excellent** means for preparing for the current exams, as well as for the quizzes.

Final Examination:

Date, time and place to be announced (Final Exam period: December 7 through December 14). The exam will cover all of the material dealt with in CHEM-111.

Lecture and Quiz Schedule [CHEM-111 PSI Guide module numbers in square brackets]:

Week 1 (2 lectures): Course Overview, Tools of the Trade (Sig. Figs., Exponential Notation, Logs, Units, Temperature Conversions), The Mole Concept, Formulas (Empirical and True) [Module I]

Week 2 (2 lectures): The Gaseous State [Module II] (Quiz I)

Week 3 (3 lectures): Real Gas Behavior, The Solid State [Modules II and III] (Quiz II)

Week 4 (3 lectures): Nomenclature, Stoichiometry (including Hess's Law) [Modules III and IV] (Quiz III)

Week 5 (2 lectures): Concentration Calculations (including Titrations) [one lecture period devoted to Exam I review][[Module V]

Week 6: (3 lectures): Colligative Properties, The Periodic Table, Oxidation Numbers, Balancing Redox Reactions [Modules III, V, and VI] (Quiz IV)

Week 7: (3 lectures): Nature of the Atom (Classic Experiments, the Bohr Model), Dual Nature of Light and Matter [Module VII] (Quiz V)

Week 8: (3 lectures): The Schrodinger Approach, Orbitals, Electronic Configurations [Modules VII and VIII] (Quiz VI)

Week 9: (3 lectures): Electronic Configuration of Ions, Atomic Structure and Periodic Properties, Ionic vs. Covalent Bonding [Modules VIII and IX] (Quiz VII)

Week 10 (2 lectures): Electronegativity, Lewis Structures, Oxidation Numbers (revisited), Formal Charges [one lecture period devoted to Exam II review] [Module IX]

Week 11 (3 lectures): VSEPR Theory, Bond and Molecular Polarity [Module IX] (Quiz VIII)

Week 12 (3 lectures): Valence Bond Theory (including Hybridization) [Module X] (Quiz IX)

Week 13 (1 lecture): Molecular Orbital Theory [Module X]

Week 14 (3 lectures): Symmetry in Chemistry (Point Groups, Polarity, Optical Activity) - all of this is BONUS material [Module XI] (Quiz X)

Week 15 (0 lectures): [one lecture period devoted to Exam III review, one lecture period devoted to Final Exam review]

Please note that all aqueous equilibria calculations (weak acids, weak bases, buffers, solubility products) are covered in the co-requisite CHEM-115/120 courses, which include all of the lab work. The freshman CHEM-111/112/115/120 sequence for our CHEM and BIOC majors totals 12 credits, instead of the customary 8.

Absences from Quizzes and Exams:
Unexcused absences will count as zeroes. Make-up quizzes and exams will be required for **excused absences**, i.e., those for which an acceptable **written** excuse is provided, e.g., illness, death in the family, job conflicts, jury duty. All written excuses are to be given to JLB. Make-up quizzes will be administered by the TA's; make-up exams will be administered by JLB.

Grading Policy:

Average of **all** quizzes	20%	
Exam I	20%	
Exam II	20%	of final grade
Exam III	20%	
Final Exam	20%	

CHEM-111 course grades will be determined as follows:

Course Grade	Required Performance Level Overall Average
A	85 and above
A-	80-84
B+	77-79
B	73-76
B-	70-72
C+	64-69
C	56-63
C-	50-55
D+	47-49
D	43-46
D-	40-42
F	39 and below

Course Evaluation:
Your evaluation of your CHEM-111 experience (instructor, TAs and course) will be executed on-line during a two-week period at the end of the fall semester. You will be given detailed instructions in due course.

Burmy Award:

A **CRC Handbook of Chemistry and Physics** will be given to the student having the highest overall average for CHEM-111/112.

Model Kit:

You will find that a molecular model kit is a very valuable accessory in CHEM-111. You will be permitted to use these model kits (excluding all associated written material) during all relevant quizzes and exams. Make sure that your molecular model kit is designed for **general chemistry, NOT** organic chemistry.

Calculator:

You will find a non-programmable electronic calculator to be a necessity in CHEM-111.

Course Capture:

My CHEM-111 lectures will be automatically digitally recorded by the University's Course Capture system. You will be able to access the audio and video record of the proceedings, via your smart phone and/or laptop, as soon as the lecture has been completed. You will also be able to annotate the lectures electronically, as they are given. Log-in information will be provided in due course.

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Texts on Reserve for CHEM-111/112
Reserve Room
Morris Library

Baird, ***Environmental Chemistry***, Freeman (1995)
Brady and Senese, ***Chemistry: Matter and Its Changes***, 4th ed., Wiley (2004)
Brown, LeMay, and Bursten, ***Chemistry: The Central Science***, 10th ed., Prentice-Hall (2006)
Averill and Eldridge, Chemistry: Principles, Patterns and Applications (vol 1), Pearson/Benjamin Cummings (2013)
Chang and Goldsby, ***Chemistry***, 11th ed., McGraw-Hill (2013)
Ebbing and Gammon, ***General Chemistry***, 9th ed., Houghton Mifflin (2009)

Fine, Beall, and Stuehr, **Chemistry for Scientists and Engineers**, Brooks/Cole, (2000)
Gilbert, Kirss, Foster and Davies, **Chemistry: The Science in Context**, 3rd ed., Norton (2004)
Hill, Petrucci, McCreary and Perry, **General Chemistry**, 4th ed., Prentice Hall (2005)
Keiter, Mosher, and Scott, **Chemistry: The Practical Science**, Houghton Mifflin (2008)
Liska, **Drugs and the Human Body, with Implications for Society**, 4th Ed., Macmillan (1994)

❖ Mahan and Myers, **University Chemistry**, 4th Ed., Benjamin/Cummings (1987)
McMurry and Fay, **General Chemistry: Atoms First**, Prentice-Hall (2010)
❖ Munowitz, ***Principles of Chemistry***, Norton (2000)
Silberberg, ***Principles of General Chemistry***, McGraw-Hill (2007)

Spencer, Bodner, and Rickard, ***Chemistry: Structure and Dynamics***, 2nd ed., Wiley (2003)
Tro, ***Chemistry: A Molecular Approach***, Pearson/Prentice Hall (2008)
Whitten, Davis, Peck, and Stanley, ***General Chemistry***, 7th ed., Thomson Brooks/Cole (2004)

❖ Zumdahl, ***Chemical Principles***, 6th ed., Houghton Mifflin (2009)

❖ Honors-level text

CHEM-111
2012 Fall Semester (12F = 2128)

Month	Week				Quiz
September	1		29 First Class	31	
	2	3 Labor Day	5	7	Q 1
	3	10	12	14	Q 2
	4	17	19	21	Q 3
	5	24	26 Exam I	28	
October	6	1	3	5	Q 4
	7	8	10	12 Mid-Term Marking Period	Q5
	8	15	17	19	Q6
	9	22	24	26	Q7
November	10	29	31 Exam II	2	
	11	5	7	9	Q8
	12	12	14	16	Q9
	13	19	21 TG Holiday	23	
December	14	26	28	30	Q10
	15	3	5 Exam III & Last Class	7 Final Exams	
		10 Final Exams	12 Final Exams	14 Final Exams	

CHEM 111 Course Learning Goals

(Numbers in parentheses indicate the departmental learning goals (http://www.udel.edu/chem/goals.html) with which each course goal is aligned.)

After successful completion of this course, a student should be able to:

1. Describe key historical ideas and interpret/evaluate experimental evidence related to the atomic model of matter and the physical structure of atoms. (1)
2. Assign/interpret names and formulas for ionic/binary compounds, know charges of common mono- and polyatomic ions, and use in balanced equations. (1)
3. Recognize and apply fundamental stoichiometric relationships in analyzing and solving quantitative problems for both irreversible and equilibrium systems. (1)
4. Describe the characteristic features of ionic bonding and explain/apply their connection to the physical and chemical properties of ionic compounds. (1)
5. Describe the basic features of structure determination through x-ray crystallography; know and apply the characteristics of simple unit cells and packing motifs in calculating/interpreting densities and packing efficiencies of crystalline solids; describe/explain/visualize common ionic structures. (1)
6. Know the distinguishing features/common types/formulas of electrolytes; apply that knowledge in explaining/visualizing/predicting the molecular level behavior of such substances in solution; explain/predict the qualitative conductivity behavior of electrolytes in solution. (1)
7. Explain the nature of and driving forces behind common reactions of aqueous ionic compounds including metathesis and redox processes; recognize common oxidants/reductants; and balance/use complex redox reactions. (1)
8. Describe/explain/apply key observations and concepts of quantum theory; explain/apply the electronic structures of a one-electron and multielectron atoms. (1)
9. Explain/apply the connection between electronic structure and periodic trends in the prediction/analysis of the physical and chemical behavior of elements and compounds. (1)
10. Describe the characteristic features of covalent bonding and explain/apply their relationship to physical properties; write/analyze Lewis structures and explain/predict molecular geometries and polarities for covalent compounds; explain/apply valence bond and molecular orbital theory in evaluating bonding in covalent molecules and extended solids. (1)
11. Describe the characteristic features of metallic bonding and explain/apply their connection to physical and chemical properties of metals and alloys using the electron sea model. (1)
12. Describe empirical gas laws; explain/apply kinetic theory in the analysis/prediction of the behavior of ideal and real gases. (1)
13. Work together with other students in discussing ideas, evaluating information and formulating solutions to problems. (8)
14. Communicate ideas clearly and effectively in written and oral formats. (10)
15. Find and evaluate sources and information needed in solving problems. (3)