CHEM-111 INFORMATION SHEET (Sections 020D - 025D)
Fall, 2015

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		F 12:20 - 1:10PM BRL 206		
021D		F 1:25 - 2:15PM BRL 206		
022D		F 2:30 - 3:20PM BRL 206		
023D		F 12:20-1:10PM BRL 116		
024D		F 1:25 - 2:15PM BRL 207		
025D		F 2:30 - 3:20PM BRL 207		

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 three UG CHEM-111 Teacher's Assistants will also hold weekly help sessions [Kimberly Buchanan (BS/CHEM/16 kabuchan@udel.edu ; Matthew Hurlock (BS/BIOC/17), mhurlock@udel.edu ; Sean Lein (BS/BIOC/17), slein@udel.edu]

Texts:

Chemistry and Chemical Reactivity (9th Ed.), by Kotz, Treichel, Townsend,and Treichel [UD BA/85] (ISBN: 978-1-133-94964-0).

Student Solutions Manual for CCR (9th ed.), by Banks; (ISBN: 978-1-133-94964-0)

CHEM-111 Personalized System of Instruction (2015 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 ***KTTT***) and detailed lecture notes will be found in the eleven **CHEM-111 PSI** modules.

Problem Assignments:

Problem assignments (drawn from ***KTTT***, 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 ***KTTT*** are given in Appendix N. Detailed answers to the blue numbered Study Questions in ***KTTT*** 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 - **Saturday, October 3, 9:00AM-noon, (TBD)**. Material covered between September 2 and September 25, inclusive. Review session will be held on October 2, during the lecture period.

Exam II - **Saturday, November 7, 9:00AM-noon, (TBD).** Material covered between September 28 and October 30, inclusive. Review session will be held on November 6, during the lecture period.

Exam III - **Friday, December 11, 5:00-7:00 p.m., (TBD).** Material covered between November 2 and December 9, inclusive. Review session will be held on December 11, 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 14 through December 19). 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 Thanksgiving Holiday

Week 14 (3 lectures): Molecular Orbital Theory [Module X] (Quiz X)

Week 15 (2 lectures): Symmetry in Chemistry (Point Groups, Polarity, Optical Activity) [one lecture period devoted to Exam III Review] [Module XI]

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 11 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)
Brown, LeMay, Bursten, Murphy, Woodward and Stoltzfus, ***Chemistry: The Central Science***, 13th ed., Pearson (2015)
Burdge and Overby, ***Chemistry: Atoms First***, McGraw-Hill (2012)
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)

Gilbert, Kirss, Forster and Davies, ***Chemistry***, 4th ed., Norton (2015)
Fine, Beall, and Stuehr, ***Chemistry for Scientists and Engineers***, Brooks/Cole, (2000)
Jesperson and Hyslop, ***Chemistry: The Molecular Nature of Matter***, 7th ed., Wiley (2015)
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, Chemistry: ***The Molecular Nature of Matter and Change,*** McGraw-Hill (2012)
Oxtoby, Gillis, and Butler, ***Principles of Modern Chemistry***, 8th ed., Cengage (2016)
Spencer, Bodner, and Rickard, ***Chemistry: Structure and Dynamics***, 5nd ed., Wiley (2012)
Tro, ***Chemistry: A Molecular Approach,*** 3rd ed., Pearson/Prentice Hall (2016)

*Zumdahl & Zumdahl, ***Chemical Principles***, 9th ed., Cengage Learning (2014)

*Honors-level text

CHEM-111
2014 Fall Semester (14F = 2148)

Month	Week	M	W	F	Quiz
September	1		2 First CHEM-111 Class	4	
	2	7 Labor Day	9	11	Q 1
	3	14	16	18	Q 2
	4	21	23	25	Q 3
	5	28	30	2	3-CHEM-111 Exam I
October	6	5	7	9	Q4
	7	12	14	16 Mid-term Grades due	Q5
	8	19	21	23	Q6
	9	26	28	30	Q7
November	10	2	4	6	7-CHEM-111 Exam II
	11	9	11	13	Q8
	12	16	18	20	Q9
	13	23	25	27	TG Holiday
December	14	30	2	4	Q9
	15	7	9	11 Last Class & CHEM-111 Exam III	
		14 Final Exams	16 Final Exams	18 Final Exams	19 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)