

# Andrews University

## Fall Semester 2012 *CHEM-131-001, General Chemistry I, 4.0 Credits*

### Course Description

This first course in chemistry is for students planning to major in science and engineering. Topics include stoichiometry, atomic and molecular structure, bonding, states of matter, solutions, chemical kinetics, and chemical equilibrium. Weekly: 3 lectures, 2 recitations, and a 3-hour lab. Prerequisite: MPE>P3

### Course Pre/Co-requisites

You must have a Math Placement Exam Score (MPE) greater than or equal to P3 or passing grades in MATH166/168 or MATH191/195; High school chemistry or physics strongly recommended. Next semester is CHEM132 which is a continuation of CHEM131, and you will need a grade of C- or better in CHEM131 to take the second semester.

### Schedule

Lecture Schedule: MWF 9:30 a.m. - 10:20 a.m.

Location: HH107

Recitation (problem solving): TR 9:30 a.m. - 10:20 a.m.

Location: HH107

Lab Schedule: Monday, 2:30-5:20 p.m. OR 6:30-9:20 p.m.

Location: HH220, HH221

Instructor Office Hours: TWR afternoons 1 - 4 p.m. or by appointment.

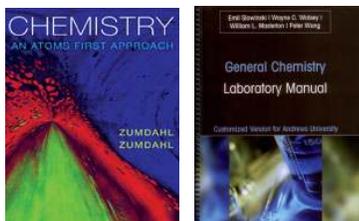
Location: HH322

### Instructor

Ryan Hayes, Ph. D.: Office: Halenz Hall 322 (third floor); Phone: 269-471-3248 (on-campus, 3248);  
Email: hayesr@andrews.edu

### Required Material Overview for Lecture & Lab

#### Required Items



- 1) Text Book (1<sup>st</sup> Ed.).
- 2) OWL (online access)
- 3) eClicker
- 4) Lab Manual
- 5) Safety Glasses (Chem. Dept.)
- 6) Molecular Models (Chem Dept.)

The following items, which are available in the University Bookstore, are required or are recommended for Chemistry 131:

- a. Textbook: *Chemistry: An Atoms First Approach*, by Zumdahl and Zumdahl, First edition; **REQUIRED**.
- b. Online registration for OWL for homework problem submission and grading (see Page 4). **REQUIRED**. – Bundled with textbook if purchased at AU Bookstore.
- c. eClicker for attendance and quizzes. Keep an extra 2 to 4 AA batteries at all times. **REQUIRED**
- d. Laboratory Manual: *General Chemistry Laboratory Manual*– 2010 (AU Customized Version); **REQUIRED (Only available at AU Bookstore- New this year)**.
- e. Laboratory Safety Goggles: **REQUIRED**. You can purchase some nice (somewhat stylish) safety glasses from the Chemistry department (HH225). Oversized safety glasses that fit over prescription eye-ware are also available.
- f. Models: Ball and stick models to help you visualize the arrangement of atoms in molecules. These will be made available only through Chemistry Department (HH225). **REQUIRED**.
- g. Moodle – web-based classroom management program that AU uses for showing grades, posting

class resources (PDF files, etc.), sending information to students, giving quizzes, etc. **REQUIRED** (no additional cost, but you need to make sure you are registered and have access).

- h. Calculator – Minimum functions in addition to simple arithmetic functions: logarithm (log), natural logarithm (ln), exponential ( $e^x$ ), scientific notation (EE or E or EXP). A graphing calculator or programmable one is not necessary but allowable.

## Course Goal

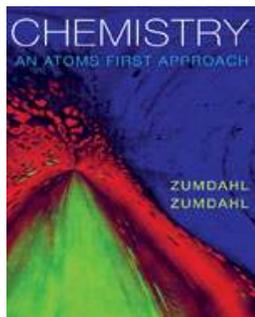
General Chemistry, a two semester introductory study of elements and their compounds, their reactions, and their physical and chemical properties, is the fundamental survey course of the disciplines of chemistry and biochemistry. It serves as a prerequisite or a cognate course for several degree programs such as Agriculture, Biology, Biochemistry, Chemistry, Engineering, Clinical Laboratory Science, Nutrition, Physical Therapy, and Physics. The overall goal for this course is that each student will be able to appreciate the modern view of the atom and the fundamental nature of solid, liquid, and gaseous materials from atoms to compounds. The students will learn the properties of atoms, how atoms are incorporated into compounds, and categories of simple reactions all of which will enhance the student's ability to understand and communicate scientific information in a chemical context.

## Course Content

During the course of the semester, we will be covering the following topics. These are the chapter titles, but also are good descriptions of the content covered in General Chemistry 1 (CHEM131).

|   |   |
|---|---|
| Review: Measurements and calculations in chemistry.       | 6. Chemical Energy: Enthalpy                              |
| 1. Chemical Foundations: Modern understanding of the atom | 7. Gases  |
| 2. Atomic Structure and Periodicity                       | 8. Liquids and Solids                                     |
| 3. Atoms to Molecules                                     | 9. Stoichiometry  |
| 4. Bonding: General Concepts                              | 10. Types of Chemical Reaction and Solution Stoichiometry |
| 5. Molecular Structure and Orbitals                       | 22. Organic Chemistry - Introduction                      |

## Course Textbook (Required)



“*Chemistry: An Atoms First Approach*” by Zumdahl and Zumdahl, 1<sup>st</sup> edition  
(Publisher: Cengage) ISBN10: 0-8400-6532-9, ISBN13: 978-0-8400-6532-2

This is a unique textbook and it is different from other General chemistry textbooks because it starts and builds on our modern, quantum view of the atom. Other textbooks cover this information late in the first semester. This textbook uses many examples that connect to biochemistry and medical information.

**!! IMPORTANT!!** You must also have OWL (Online Web Learning) and LabWorks which are web-based homework and laboratory skill assessment sites. This means some of your homework and lab work will be submitted through these websites. They require that you sign up and pay for access to these web sites. However, if you purchase the textbook from the AU Bookstore, OWL and LabWorks will be bundled into the price. You will pay one price at the AU Bookstore and get three (3) things: Textbook, OWL, and LabWorks.

**Note:** If you buy your textbook from Amazon or other venue, you will need to purchase the OWL and LabSkills separately and at a higher cost. You may do this at the following Cengage Website:

<https://www.cengagebrain.com/shop/isbn/9780840065322>

## Course Information – Online Web Learning

**Online Web Learning (OWL): Homework answers submitted online**  
***(Three late homework extensions are available upon request)***

There is a cost for using OWL but the price was bundled into the textbook if you purchased at the AU Bookstore. If you have purchased the textbook elsewhere, then you will need to buy it separately, and the most recent cost was \$113 for a 24-month subscription. If you did not get the bundle at the AU Bookstore, then you will need to visit the website:

<http://www.cengage.com/owl/> (click: General Chemistry, then our textbook).

Grading for OWL problems will be done instantly so you will immediately know the results of your work. You will be able to resubmit up to a total of 5 submissions for each problem. OWL homework problems will be available to work on until 9:20 a.m. of the lecture period (M, W, F) there are due. Your score cannot be improved after the due date and time but for many of the problems you can rework them for additional learning or practice.

\*\*You can have up to three requests for additional submissions or deadline extensions for OWL homework via email (hayesr@andrews.edu). A total of three requests will be granted throughout the semester. Deadline extensions will only be granted if you have not seen the answers.\*\*

A list of assigned problems from the textbook has been prepared and accompanies this handout. Most of the OWL problems correlate with a problem in the text book. A good practice is to solve all problems in a notebook and enter answers in OWL for the required problems. That way you have solved problems to study in preparation for examinations. Also, you can look at odd numbered problems in the textbook that are before or after that problem to gain additional insight into solving that particular problem.

## Course Information – Hand-in Homework/Mailbox Info

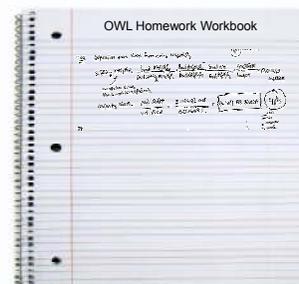
**No late homework accepted: Hand to assistant between 9:20 and 9:30 a.m.**

About half of the homework problems are assigned as “Hand-in” homework problems. Please refer to the Figure on the right for the correct format to hand in (folded, name, date, assignment #, BOX #). To obtain full points for each hand-in problem, you will write your method of solving the problem as well as the answer. Answers will be graded based on the correct numerical response, appropriate number of significant digits, and relevant units for that answer. Grading may also take into account the method, equation, formula, or process of answering the homework problem so you **MUST SHOW ALL YOUR WORK**.

For problems submitted on paper at the end of a chapter, all or a randomly selected



Many homework assignments will be completed through OWL. Please sign up or log into this website.



Record your online homework in a notebook for easy reference for test preparation and getting help from instructor.

### **HAND-IN HOMEWORK**

1. Please fold all homework lengthwise in half.
2. On the outside top right, place the following information

•Name  
 •CHEM131  
 •Lecture #  
 •Date  
 •Box # \_\_

set of problems may be graded, and the graded paper will be returned to your assigned box in the hallway outside HH107. Mailbox assignments will be made during the first two weeks of class or before the first hand-in homework is assigned. It is a good idea to save all of your homework submissions and make sure they are recorded correctly. Grades for homework scores should be made available on Moodle periodically throughout the semester. Here is a sample problem that requires Unit Dimension Analysis and reporting of an answer involving a chemical entity. This is the correct way to write out the work for full credit being sure that the answer has the correct significant digits, unit, and label.

70 Determine moles NaOH from moles  $\text{KHC}_8\text{H}_4\text{O}_4$  (1P)

$$0.902 \text{ g KHC}_8\text{H}_4\text{O}_4 \cdot \frac{1 \text{ mol KHC}_8\text{H}_4\text{O}_4}{204.222 \text{ g KHC}_8\text{H}_4\text{O}_4} \cdot \frac{1 \text{ mol HC}_8\text{H}_4\text{O}_4^-}{1 \text{ mol KHC}_8\text{H}_4\text{O}_4} \cdot \frac{1 \text{ mol OH}^-}{1 \text{ mol HC}_8\text{H}_4\text{O}_4} \cdot \frac{1 \text{ mol NaOH}}{1 \text{ mol OH}^-} = 0.00442 \text{ mol NaOH}$$

use all atoms since this is what is weighed out.

$$\text{Molarity NaOH} = \frac{\text{mol NaOH}}{\text{vol NaOH}} = \frac{0.00442 \text{ mol}}{0.02645 \text{ L}} = 0.167 \text{ M NaOH}$$

4pts

— unit  
— SD  
— answer  
— work

74

**YOU DO NOT GET EXTENSIONS ON HAND-IN HOMEWORK.**  
**No late Hand-in Homework accepted.**

## Course Information – eClickers

Please obtain an eInstructions clicker (student response system) from the AU Bookstore. You will need to also purchase a subscription to use this instrument. A lifetime subscription is recommended. CPS™ student response systems, shown to the right, are used by millions of students and teachers in more than 600,000 classrooms. Fortunately, all of AU uses this same clicker response system so it is a onetime purchase for the students. Many other universities do not have a standard, uniform response system so students are forced to carry around as many as five different clickers. Log into the following website <http://www.einstruction.com/> (is the main website...you can link to everything from here)



<https://cpsonlinehe.einstruction.com/hggstudent.cfm> (faster link to student enrollment) – videos on the bottom of the page will help answer questions you might have about signing up and getting the response system to work. To register your response system to CHEM131 you will need the following code (note: first letter is a capital “i”).

**Chem131 Class Code: I52888L438**

## Course Information – Models

One of the more difficult concepts in chemistry is the visualization of the geometric arrangement of atoms within molecules and compounds. To help this process, CHEM131 is adding a laboratory in which the student will assemble parts of a chemical model kit into the various geometric arrangements. The model kit will need to be purchased by the student for about \$22 from the Chemistry Department. The students will also find these models helpful tools to solve homework problems and improve their understanding of molecular configurations. In addition, this same model kit will be used in Chem231/Chem232 Organic Chemistry. Students will be able to use this same set of models for their time here at AU and beyond.

## Course Information – Moodle

Course information such as announcements, hand-outs, and quizzes may be provided through Andrews University's classroom management web program called Moodle. You should be able to access this website using your AU email ID and email password. <https://aumoodle.andrews.edu/login/index.php>

## Course Policies: CP1-CP7

The following items are for the benefit of everyone in the course. Please read these over and be familiar with them.

### CP1) Examination (Mid-Term) Taking

Four mid-term examinations are scheduled for 50 minutes each. At the end of that time, examination papers will be collected for grading. Papers not turned in when the instructor leaves the room will not be collected for grading and will constitute the drop examination (see Examination and Grading Policy section). If you have any officially recognized disability that prevents you from doing the examination in the 50 minute period, please make arrangements prior to the first examination; The instructor will need a physician's statement about the disability.

### CP2) Attendance Policy

Regular and prompt attendance at all classes, laboratories and other academic appointments is required of each student.

**Attendance:** You are expected to attend class every day, and to participate in its learning activities. By 9:30 a.m., you should be in your seat ready for class to begin. An attendance record will be taken of each lecture and recitation period using an eClicker system. Absences and tardiness will only be accrued for Lecture Periods on Monday, Wednesday, and Friday. **On Lecture Days, you must arrive before the 9:30 a.m. and register your attendance using the eClicker system.** Those coming in after 9:30 a.m. are tardy. Three tardies are considered an absence. Five minutes after the class has begun the eClicker system will be turned off and you will not receive credit for attendance and it will count as an absence. 10% or more absences may lower your course grade by 1/3 of a grade, for example, B+ to B, and 20% absences are sufficient to fail a student. Please refer to the University's policy of attendance and tardiness for further details. In the event your eClicker fails, you must notify the instructor BEFORE class on each lecture/recitation day that the eClicker is not working.

**Recitation:** Attendance will be taken via eClicker system and recorded on Tuesdays and Thursdays. You will receive a bonus point for every two recitation period you attend. Attendance is not mandatory except as noted on the class schedule (see the last page of syllabus) or as designated in advance by the instructor. All students are strongly encouraged to attend these problem solving sessions. Course history indicates students that attend have a whole letter grade average than those who do not attend. It is in your best interest to attend General Chemistry everyday.

**Class Absences:** Whenever the number of absences exceeds 20% (10% for graduate classes) of the total course appointments, the teacher may give a failing grade. Merely being absent from campus does not exempt the student from this policy. Absences recorded because of late registration, suspension, and early/late vacation leaves are not excused. The class work missed may be made up only if the teacher allows. Three tardies are equal to one absence.

**Excused Absences:** Excuses for absences due to illness are granted by the teacher. Proof of illness is required. Residence hall students are required to see a nurse on the first day of any illness which interferes with class attendance. Non-residence hall students should show written verification of illness obtained from their own physician. Excuses for absences not due to illness are issued directly from the dean's office. Excused absences do not remove the student's responsibility to complete all requirements of a course. Class work is made up by permission of the teacher.

### CP3) Academic Dishonesty Policy

Honesty in all academic matters is a vital component of personal integrity. Breaches in academic integrity principles are taken seriously. Acts of academic dishonesty as described in the University *Bulletin* are subject to incremental disciplinary penalties with redemptive intent. Such acts are tracked in the office of the Vice President for Academic Administration. Repeated and/or serious offenses will be referred to the Committee on Academic Integrity for further recommendations on penalties.

(Revised August 2004) In addition, the faculty of the Department of Chemistry and Biochemistry has agreed on the following actions to deal with academic dishonesty discovered in chemistry/biochemistry courses and laboratory work.

1. In the case of cheating on in-class examinations, attendance, quizzes or collaboration on take-home examinations: for a first time offense, a zero score on the examination or quiz will be given; a second time offense in the same course will result in a failing grade (F).
2. In the case of "dry" labing, i.e. copying laboratory reports, or submitting another person's report as your own: 1<sup>st</sup> time offense, all culpable individuals will receive a score of zero for the report; 2<sup>nd</sup> time offense all culpable individuals may receive a score of zero for the entire laboratory grade at the discretion of the department's faculty.
3. In the case of plagiarism, the student will be required to rewrite the assignment to receive credit, except in the case of laboratory reports as indicated above.

### CP4) Disability Accommodation Policy

If you qualify for special assistance under the American Disabilities Act, please see the instructor as soon as possible so that accommodations can be made.

### CP5) Professionalism Policy

To prepare students for the professional world, certain behaviors/activities are not allowed in the classroom.

- Cell Phones, Smartphones, Personal Laptops, and Recording devices: Cell phones should be turned off before entering the classroom. Picture-taking during class is not allowed. Recording devices are allowed only if pre-approved by instructor, and if approved, under no circumstance are recordings—visual or verbal—to be posted on a public website.
- Laptops should not be used at all during lecture times. This is too easy to distract other students around you and it is challenging to type accurate notes involving chemical and mathematical information. It is disrespectful and unprofessional to use these devices inappropriately during class. However, if you are using a tablet computer with pen input, this can be used **with permission** from instructor.
- Late Assignments are unacceptable unless prearranged with instructor.
- Tardiness
- Eating in class: Please do not bring food or beverages to class. Water is permitted.



No Food or Drink

Presentation is important. Your attention to detail, demeanor, and attire factor into how you are perceived as a professional. Active participation in class discussions and critiques is an essential part of learning. Without participating and expressing opinions and thoughts, it is impossible to clarify your goals and develop a personal style.

### CP6) Emergency Protocols

Andrews University takes the safety of its student seriously. Signs identifying emergency protocol are posted throughout buildings. Instructors will provide guidance and direction to students in the classroom in the event of an

emergency affecting that specific location. It is important that you follow these instructions and stay with your instructor during any evacuation or sheltering emergency.

## CP7) Email Communication Policy

Email communication from instructor to student will primarily take place using the student and instructors AU email account. Student's may opt to forward their AU email to another account, but it is the student's responsibility to make sure the forwarded email link does not break during the semester. It is the student's responsibility to make sure emails from the instructor do not end up in the Spam or Junk email sections.

AU allows all AU email holders to have access to all Spam filtered email, and the ability to control the Spam filter settings on an individual level. This control is accessed via a website called CanIt-PRO anti-spam filter from Roaring Penguin Software Inc. The AU link to this web program is: <https://secure.andrews.edu/spam/>. Use your AU email ID and password to login.

Trapped emails can be found here and released to the recipient. A RSS feed can be set up in Outlook or comparable email program to have a safe way to be notified of trapped contents. AU IT department can assist in accessing this information and setting up the RSS feed.

## Course Information – Lab

Please see the separate syllabus for the lab portion of this class. It includes information about LabSkills (online pre-lab assignments), goggles, grading, safety, listing of labs, lab manual, and other important information relative to the lab.

## Examination and Grading Policy

The final score will be composed of the scores from homework, quizzes, midterms, final examination, laboratory, and attendance bonus points as described:

| % Total | Category: Description  |
|---------|--|
| 15%     | <b>Homework:</b> Homework will be graded and the final homework score will be normalized to 150 points, equivalent to one and a half midterm exams. Late assignments will not be collected or graded; extra-credit or makeup assignments will not be made, collected, or graded.   |
| 10%     | <b>Quizzes:</b> Unannounced 10 point quizzes may be given once per week. These will primarily cover material presented within the last three lectures. The final quiz score will be normalized to 100 points.  |
| 30%     | <b>Midterm Exams:</b> Four 100 point midterm exams will be given during the semester. The total midterm exam score will be the sum of the 3 highest midterm exam scores. That is, the lowest midterm score will be dropped from consideration. Note: <b>NO MAKE UP EXAMINATIONS WILL BE GIVEN.</b> In the event that a midterm exam is not taken, the other three midterm scores will be used as previously stated. It should be remembered, however, the midterm exams constitute an important part of the learning process, and the material covered on midterms may appear again on the final exam. |
| 20%     | <b>Final Exam:</b> The final examination in the <u>Fall Semester</u> will be a combination midterm and final. The midterm portion (50 points) will cover lecture material presented between the last midterm and the final examination and the final exam portion (150 points) will cover previous material covered throughout the semester.   |
| 25%     | <b>Laboratory:</b> The laboratory part of the course will be given 250 points credit.  |
| Bonus   | <b>Attendance:</b> Attendance will be taken every lecture and recitation period. You will receive a bonus point for every two recitation period you attend.  |
| 100%    | <b>TOTAL SCORE = See Moodle for periodic updates throughout the semester.</b>  |

### Grading:

The overall point distribution will be as follows:

| Category                       | Points      |
|--------------------------------|-------------|
| Homework                       | 150         |
| Quizzes                        | 100         |
| Midterm Exams (lowest dropped) | 300         |
| Lab Score                      | 250         |
| Final Examination              | 200         |
| <b>TOTAL POSSIBLE POINTS</b>   | <b>1000</b> |

Grades will be based on the following percentages:

| Grade | Start% |
|-------|--------|
| F     | 0      |
| D     | 50     |
| C-    | 60     |
| C     | 65     |
| C+    | 71     |
| B-    | 76     |
| B     | 80     |
| B+    | 84     |
| A-    | 88     |
| A     | 94     |

## Assignments

| Lecture    | Date & Day |                | Lab <sup>a</sup>   | Reading <sup>b</sup>                            | Homework <sup>c</sup>  |  | Due @ 9:30 AM on... | Chapter Title   |  |
|------------|------------|----------------|--|---|--|--|---------------------|---|--|
|            |            |                |  |   | OWL = Online Homework  | Hand-in <sup>d</sup>   |                     |   |  |
| 1          | 8/27       | M              | Safety Test & Lab Training   | Ch Review                                       | Intro(1a,1b,2a,2b,3a,3b,3c)<br>Math(1a,1b,2,3a,3b,3c,8d)<br>Review(1a,1b,3b,3e,3h,3i,4h,4j,4l) |  | 8/29                | Review: Measurement and Calculations in Chemistry             |  |
| 2          | 8/29       | W              |  | Ch 1  | Review: 5e,6e,7a,7c,7d,7h,7i,7m,7n.<br>Ch1: 4b,6c,6e,7f,8,9b                                   |  | 8/31                | Ch 1: Chemical Foundations                                    |  |
| 3          | 8/31       | F              |  | Ch 2: 2.1-2.5                                   | Ch2: 1b,1c,1g,2b,2f,2l,4c,4h   | Ch1: 16a-e, 44, 48,50  | 9/5                 | Ch 2: Atomic Structure and Periodicity                        |  |
| Labor Day  | 9/3        | M              | <b>No Class or Lab - AU Labor Day Break - Class resumes on Tuesday</b> |   |  |  |                     |   |  |
| 4          | 9/5        | W              |  | Ch 2:2.6-2.10                                   | Ch2: 6d,7b,7d,7e,8b,9b,10a,10b   |  | 9/7                 |   |  |
| 5          | 9/7        | F              |  | Ch 2.11-EC                                      | Ch2: 11d,11j,11m,12g,12m,13b,13c   |  | 9/10                |   |  |
| 6          | 9/10       | M <sup>e</sup> | Check-in & Lab #1  | Ch 3:3.1-3.3                                    | Ch3: 2d,3a,3d,3i,3j  | Ch3: 30,36,40  | 9/12                | Ch 3: Atoms to Molecules                                      |  |
| 7          | 9/12       | W <sup>e</sup> |  | Ch 3:3.4-3.6                                    | Ch3: 4a,4g,5g,5l,5m,5n,5o,5s,6b,6c,6d  | Ch3: 60,84   | 9/15                |   |  |
| 8          | 9/14       | F <sup>e</sup> |  | Ch 3:3.7-EC                                     | Ch3: 7b,7e,7g,7i,7j,7l,7m,7n,7p,7q,7r,7s,7w,7y,7z,7ae  |  | 9/17                |   |  |
| 9          | 9/17       | M              | 5  | <b>EXAMINATION No. 1: Chapters 1, 2 &amp; 3</b> |  |  |                     |   |  |
| 10         | 9/19       | W              |  | Ch 4:4.1-4.4                                    | Ch4: 2b,2i,3a,3c,4d,4i,4j,4k,4o  | Ch4: 34,40,44,50   | 9/21                | Ch 4: Bonding - General Concepts                              |  |
| 11         | 9/21       | F              |  | Ch 4:4.5-4.8                                    | Ch4: 6b,8b,8c  | Ch4: 62,66,70  | 9/24                |   |  |
| 12         | 9/24       | M              | 13   | Ch 4:4.9-EC                                     | Ch4:10a,10b,10d,10e,10i,11d,12c,12d,12f,12g  | Ch4: 82,86,92  | 9/26                |   |  |
| 13         | 9/26       | W              |  | Ch 5:5.1  | Ch5: 1a,1e,1f,1g,1o,1p,1q,1s,1t,1u   |  | 9/28                | Ch 5: Molecular Structure and Orbitals                        |  |
| 14         | 9/28       | F              |  | Ch 5:5.2  | Ch5: 2d,2n,2o,2q,2v,2z   |  | 10/1                |   |  |
| 15         | 10/1       | M              | 45   | Ch 5:5.3-EC                                     | Ch5: 3c,3f,3g,4c,24,30,64,80   |  | 10/3                |   |  |
| 16         | 10/3       | W              |  | Ch 4-5 Review                                   |  |  |                     |   |  |
| 17         | 10/5       | F              |  | <b>EXAMINATION No. 2: Chapters 4 &amp; 5</b>    |  |  |                     |   |  |
| Fall Break | 10/8       | M              | <b>No class or Lab on 10/10 and No recitation on 10/11 - Tuesday</b>   |   |  |  |                     |   |  |
| 18         | 10/10      | W              |  | Ch 6:6.1-6.3                                    | Ch9:3c,3e,4a,4b. Ch6: 1g,3b,3c   | CH 6:36,38,42. Ch9:60  | 10/12               | Ch 6: Chemical Energy   |  |
| 19         | 10/12      | F              |  | Ch 6:6.4-6.5                                    | Ch6: 4d,4e,4f,5e,5f. 12,19,38,48   |  | 10/15               |   |  |
| 20         | 10/15      | M              | 14   | Ch 6:6.6-EC                                     |  | Ch6: 52,66,68,74,82,90   | 10/17               |   |  |
| 21         | 10/17      | W              |  | Ch 7:7.1-7.3                                    | Ch7: 1b,1c,1d,2c,2f,2i,3g,3h,3i,3o,3p  |  | 10/19               | Ch 7: Gases   |  |
| 22         | 10/19      | F              |  | Ch 7:7.4-7.6                                    | Ch7: 4c,4d,5c,5d,5e,5f,5g,5l,6d  | Ch7: 46, 88  | 10/22               |   |  |
| 23         | 10/22      | M              | 10   | Ch 7:7.7-EC                                     | Ch7: 7a,7b,9a. 24,46,58,68,79,95,97  |  | 10/24               |   |  |
| 24         | 10/24      | W              |  | Ch 6 & 7 Review                                 |  |  |                     |   |  |
| 25         | 10/26      | F              |  | <b>EXAMINATION No. 3: Chapters 6 &amp; 7</b>    |  |  |                     |   |  |
| 26         | 10/29      | M              | 43   | Ch 8:8.1-8.2                                    | Ch8: 1e,1g,1h,1l,1m,1n   |  | 10/31               | Ch 8: Liquids and Solids                                      |  |
| 27         | 10/31      | W              |  | Ch 8:8.3-8.7                                    | Ch8: 4b,4e,7c,7f,7g  | Ch8: 50,56,60  | 11/2                |   |  |
| 28         | 11/2       | F              |  | Ch 8:8.8-EC                                     | Ch8: 8b,8d,8j,8l,8r,8s,8t,9d,9e  |  | 11/5                |   |  |
| 29         | 11/5       | M              | 24   | Ch 9:9.1-9.3                                    | Ch9: 1f,2a,2d,2f,2g,2k   | Ch9: 46,48,58  | 11/7                | Ch 9: Stoichiometry   |  |
| 30         | 11/7       | W              |  | Ch 9:4-9.5                                      | Ch9: 4f,4i,5a,5e,5g,5i   | Ch9: 72,82,114,134   | 11/9                |   |  |
| 31         | 11/9       | F              |  | Ch 9:9.6-EC                                     | Ch9: 6c,6d,6j,6q,6t  | Ch9: 130,136   | 11/12               |   |  |
| 32         | 11/12      | M              | 12   | Ch 10:10.1-10.3                                 | Ch10: 2b,3g,3m,3w,3x,3y  | Ch10: 38,40,46   | 11/14               | Ch 10: Types of Chemical Reactions and Solution Stoichiometry |  |
| 33         | 11/14      | W              |  | Ch 10:10.4-10.7                                 | Ch10: 5c,5e,5h,6a,6b,6e,6f,6h,7h,7i  |  | 11/16               |   |  |
| 34         | 11/16      | F              |  | Ch 10:10.8-10.9                                 | Ch10: 8a,8b,8c,8d,8e,8j,8p,8q,8r   | Ch10: 56,74  | 11/19               |   |  |
| 35         | 11/19      | M              | 46   | Ch 10:10.10-EC                                  | Ch10: 9e,9i,9k,11d,11e,11g,11l,11m,11n   |  | 11/21               |   |  |
| T-Break    | 11/21      | W              | <b>Thanksgiving Break 11/21 through 11/25</b>                          |   |  |  |                     |   |  |
| T-Break    | 11/23      | F              | <b>Thanksgiving Break 11/21 through 11/25</b>                          |   |  |  |                     |   |  |
| 37         | 11/26      | M              | 49 & Check-Out   | Ch 8-10: Review                                 |  |  |                     |   |  |
| 38         | 11/28      | W              | <b>EXAMINATION No. 4: Chapters 8, 9, &amp; 10</b>                      |   |  |  |                     |   |  |
| 39         | 11/30      | F              |  | Ch 22:22.1-22.2                                 | Ch22: 1b,1c,1e,1g,1h,1l,1m,2d,2h,2i,2j,2k,2l   |  | 12/3                | Ch 22: Organic and Biological Molecules                       |  |
| 40         | 12/3       | M              | Lab Final  | Ch 22:22.3-22.4                                 | Ch22: 3b,3d,3e,3g,4b,4f,4g,4j,4k,4p,4u,4aa   |  | 12/5                |   |  |
| 41         | 12/5       | W              |  | Ch 22:22.5                                      | Ch22: 5a,5b,5e,5f,5g,5h  | Ch22: 72,76,80   | 12/6                |   |  |
| 42         | 12/6       | R              |  | Review  |  |  | 12/10               |   |  |
| 43         | 12/10      | M              |  | <b>10:00 a.m. - 12:00 p.m.</b>                  |  | <b>Final Examination - Comprehensive over Chapters 1 through 10 &amp; 22</b> |                     |   |  |

### Footnotes:

- Experiment number from Chemistry Lab Manual—Andrews University, 2010 (AU Customized Version).
- Ch 1:1.1-1.2 means chapter 1, section 1 through chapter 1, section 2; EC=End of Chapter.
- OWL homework AND Hand-in homework problems are both due at the beginning of the next class period which is designated in the column entitled "Due on 9:30 a.m."
- Hand-in homework submitted on paper and at the beginning of the next class period. No late homework accepted.
- Week of Spiritual Emphasis: Revised class schedule for only MWF Lectures. Class is from 9:00 a.m. to 9:40 a.m.