Elementary Chemistry for Health Sciences
The University of Toledo
College of Natural Sciences and Mathematics Department of Chemistry and Biochemistry CHEM1110– 901

Instructor: Dr. Eric Findsen
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Office Hours: TBA on course website
Office Location: WO2268
Office Phone: 419-530-1508
Term: Spring 2019
Lecture Location: online(https://blackboard.utoledo.edu/)
Lecture Day/Time: N/A
Credit Hours: 3

COURSE/CATALOG DESCRIPTION
The study of chemistry for students that are studying nursing or other allied health related fields who have not had a previous course in chemistry or whose preparation in chemistry is not sufficient to begin Chemistry for Health Sciences (CHEM 1120).

COURSE OVERVIEW
CHEM 1110 is the introductory chemistry course to prepare students for CHEM 1120 – Chemistry for Health Sciences. As a prerequisite to CHEM 1120 – Chemistry for Health Sciences, it is offered for students that did not meet the criteria for direct entrance into CHEM 1120. It provides a basic foundation in math and the principles of general chemistry needed to continue on to CHEM 1120. A grade of C or higher is required in CHEM 1110 to continue on to CHEM 1120. This course is typically taken by nursing students, elementary education students, sports management students, and some science majors who do not want or need the more rigorous chemistry background that is provided by two or three years of chemistry courses. It is not appropriate for chemistry majors and may be too rigorous for non-science majors who are only interested in fulfilling their general education science core requirement. If you have any questions about course placement, please see me as soon as possible.

STUDENT LEARNING OUTCOMES
Chapter 1 Chemistry in Our Lives
- Demonstrate an understanding of the principles of scientific inquiry.
- Demonstrate the ability to think critically and employ critical thinking skills.
- Read and interpret graphs and data.
- Demonstrate an understanding of the impact of science on society.
- Define the term chemistry and identify substances as chemicals.
- Describe the activities of the scientific method.
- Review math concepts used in chemistry such as place values, positive and negative numbers, percentages, solving equations, interpreting graphs, and writing numbers in scientific notation.
Chapter 2 Chemistry and Measurement

• Demonstrate an understanding of the principles of scientific inquiry.
• Demonstrate the ability to think critically and employ critical thinking skills.
• Read and interpret graphs and data.
• Demonstrate an understanding of the impact of science on society.
• Write the names and abbreviations for metric or SI units used in measurements of length, volume, mass, temperature, and time.
• Identify a number as measured or exact; determine the number of significant figures in a measured number.
• Adjust calculated answers to give the correct number of significant figures.
• Use the numerical values of prefixes to write a metric equality.
• Write a conversion factor for two units that describe the same quantity.
• Use conversion factors to change from one unit to another.
• Calculate the density or specific gravity of a substance; use the density or specific gravity to calculate the mass or volume of a substance.

Chapter 3 Matter and Energy

• Demonstrate the ability to think critically and employ critical thinking skills.
• Read and interpret graphs and data.
• Demonstrate an understanding of the impact of science on society.
• Classify examples of matter as pure substances or mixtures.
• Identify the states and the physical and chemical properties of matter.
• Given a temperature calculate a corresponding temperature on another scale.
• Identify energy as potential or kinetic; convert between units of energy.
• Use specific heat to calculate the quantity of heat lost or gained during a temperature change.
• Describe the changes of states between solids, liquids, and gases; calculate the energy involved.

Chapter 4 Atoms

• Demonstrate an understanding of the principles of scientific inquiry.
• Demonstrate the ability to think critically and employ critical thinking skills.
• Read and interpret graphs and data.
• Demonstrate an understanding of the impact of science on society.
• Given the name of an element, write its correct symbol; from the symbol, write the correct name.
• Use the periodic table to identify the group and the period of an element; identify the element as a metal, nonmetal, or metalloid.
• Describe the electrical charge and location in an atom for a proton, a neutron, and an electron.
• Given the atomic number and the mass number of an atom, state the number of protons, neutrons, and electrons.
• Give the number of protons, neutrons, and electrons in one or more of the isotopes of an element.
• Calculate the atomic mass of an element using the abundance and mass of its naturally occurring isotopes.
• Describe the energy levels, sublevels, and orbitals for the electrons in an atom.
• Draw the orbital diagram and write the electron configuration for an element.
• Use the electron configurations of elements to explain the trends in periodic properties.

Chapter 5 Nuclear Chemistry
• Demonstrate the ability to think critically and employ critical thinking skills.
• Read and interpret graphs and data.
• Demonstrate an understanding of the impact of science on society.
• Describe alpha, beta, positron, and gamma radiation.
• Write a balanced nuclear equation showing mass numbers and atomic numbers for radioactive decay.
• Describe the detection and measurement of radiation.
• Given the half-life of a radioisotope, calculate the amount of radioisotope remaining after one or more half-lives.
• Describe the process of nuclear fission and fusion.

Chapter 6 Ionic and Molecular Compounds
• Demonstrate the ability to think critically and employ critical thinking skills.
• Read and interpret graphs and data.
• Demonstrate an understanding of the impact of science on society.
• Describe the electrical charge and location in an atom for a proton, a neutron, and an electron.
• Write the name and formula for a compound containing a polyatomic ion.
• Given the formula of a covalent compound, write its correct name; given the name of a covalent compound, write its formula.
• Draw the electron-dot formulas for covalent compounds, including multiple bonds and resonance structures.
• Use electronegativity to determine the polarity of a bond.
• Predict the three-dimensional structure of a molecule and classify it as polar or nonpolar.
• Describe the attractive forces between ions, polar molecules, and nonpolar molecules.

Chapter 7 Chemical Reactions and Quantities
• Demonstrate the ability to think critically and employ critical thinking skills.
• Read and interpret graphs and data.
• Demonstrate an understanding of the impact of science on society.
• Use conversion factors to change from one unit to another.
• Identify a reaction as a combination, decomposition, single replacement, double replacement, or combustion.
• Define the terms oxidation and reduction; identify the reactant that is oxidized and the reactant that is reduced.
• Use Avogadro's number to determine the number of particles in a given amount of moles.
• Calculate the molar mass of a substance and use the molar mass to convert between grams and moles.
• Given a quantity in moles of reactant or product, use a mole-mole factor from the balanced equation to calculate the moles of another substance in the reaction.
• Given the mass in grams of a substance in a reaction, calculate the mass in grams of another substance in the reaction.
• Identify a limiting reactant when given the quantities of two or more reactants; calculate the amount of product formed from the limiting reactant.
• Given the heat of reaction, calculate the loss or gain of heat for an exothermic or endothermic reaction.

Chapters 8 Gases
• Demonstrate the ability to think critically and employ critical thinking skills.
• Read and interpret graphs and data.
• Demonstrate an understanding of the impact of science on society.
• Describe the kinetic molecular theory of gases and the properties of gases.
• Use the pressure-volume relationship (Boyle's law) to determine the new pressure or volume when the temperature and amount of gas are constant.
• Use the temperature-volume relationship (Charles's law) to determine the new temperature or volume of gas when the pressure and amount of gas are constant.
• Use the temperature-pressure relationship (Gay-Lussac's law) to determine the new temperature or pressure when the volume and amount of gas are constant.
• Use Avogadro's law to determine the amount or volume of a gas when the pressure and temperature are constant.
• Use the combined gas law to find the new pressure, volume, or temperature of a gas when changes in two of these properties are given and the amount of gas is constant.
• Use the ideal gas law equation to solve for P, V, T, or n of a gas when given three of the four values in the ideal gas law.
• Use Dalton's law of partial pressures to calculate the total pressure of a mixture of gases.

TEACHING STRATEGIES

Discussion Postings: Please check the discussion board frequently as I will post questions and small assignments for you to reply to. You will have a few days to respond, but do make sure to check our course website on Bb and your UT email almost everyday to keep up.

Homework: We will be using the Modified Mastering Chemistry Homework System (MC). It is an online, web-based learning system that is packaged with your textbook. You need to have an access code to use it. A code is packaged in with the copies of your textbook at the UT bookstore. If you need to purchase an access code, you may do so through our course website on Blackboard. Please make sure that this is purchased soon (a two-week free trial is available from the publisher – go to Mastering Chemistry in Bb for instructions), as a problem set is due this Wednesday! A problem set will be assigned for each chapter and optional assignments for extra practice (not extra credit) will be available on MC.

Problem sets: will be posted in advance, feel free to work ahead. However, you must complete the assignments by the posted deadlines because I will not re-open the online homework assignment once the deadline passes!! For each problem in MC, you have 6 attempts to answer correctly for the HW questions and the hints. You will not have points taken away during these 6 attempts unless it is a multiple-choice question; a small deduction is made for each wrong answer to a multiple-choice question. If you do not exhaust your options or hit give up, MC may not assign points for that section; be sure to double-check for this before the submission deadline. If you do not complete the homework with a grade of 95% or higher MC will assign you another set of problems. This Adaptive Follow-Up problem set will focus on the material from that homework set that you were struggling with.

Additionally, I strongly encourage you to attempt the problems from the end of each chapter in your textbook until you are very familiar with that topic. If you are having difficulties working either the Mastering Chemistry assignments or the questions from the end of each chapter, you should either work with your classmates (a post on the discussion board of our class website on Blackboard is appropriate) or contact me.

Quizzes: Once you feel you have mastered the material for the week you can attempt the quiz. These differ from the homework problems in that you are allowed one attempt per question and given a time limit to complete it.

Final Examination: The Final Exam will be proctored and administered on campus. For students not in the Northwest Ohio area, off-campus proctored testing is an option; students will be required to locate an approved proctor in their local area and pay for any proctoring expenses. Learning Ventures is available to assist students with off-campus proctoring arrangements. Please visit http://www.utoledo.edu/dl/students/proctor_info.html to learn more about this process. If you choose off campus proctoring I suggest you start the process of locating and approving a test site now as it might take a few weeks to clear. Not having an approved proctor by finals is not grounds for an incomplete or reason to take the test late.
PREREQUISITES AND COREQUISITES
One of the following: ACT math score of 20 or higher, College Algebra Test score of 10 or higher, ALEKS score of 46 or higher, completion of MATH 1200 with a grade of C or higher, or placement into any higher-level math course (1320, 1340, 1750, 1830, 1850).

REQUIRED TEXTS AND ANCILLARY MATERIALS

**Required Textbook:** General, Organic, and Biological Chemistry: Structures of Life, 5th ed, 2015, Timberlake, Prentice Hall

**Required Online Homework Access Code:** Modified Mastering Chemistry; packaged with the custom UT version of the textbook or purchased through our Blackboard course

**Optional Materials:**
Study Guide and Selected Solutions Manual for General, Organic, and Biological Chemistry: Structures of Life, 5th ed, 2015, Timberlake, Prentice Hall. This is included with the custom UT version of the textbook. We strongly recommend that you have this book either by buying your own or by sharing a copy.

TECHNOLOGY REQUIREMENTS

**Blackboard:** ([https://blackboard.utdl.edu/webapps/login/](https://blackboard.utdl.edu/webapps/login/)) and Modified Mastering Chemistry (available through the Blackboard course) will be used on a regular basis in this course. Students need to have access to a properly functioning computer throughout the semester. Student computers need to be capable of running the latest versions of plug-ins, recent software and have the necessary tools to be kept free of viruses and spyware. Updated software is available from the Online Learning Download Center ([https://www.utoledo.edu/dl/main/downloads.html](https://www.utoledo.edu/dl/main/downloads.html)).

For exams, students may use an approved calculator. Any calculator that is programmable, whether graphing or non-graphing, and any calculator based on a phone or other device that can receive or transmit data, are prohibited.

UNIVERSITY POLICIES

**Policy Statement on Non-Discrimination on the basis of Disability (ADA):**
The University is an equal opportunity educational institution. Please read The University’s Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance.

ACADEMIC ACCOMMODATIONS

The University of Toledo is committed to providing equal access to education for all students. If you have a documented disability or you believe you have a disability and would like information regarding academic accommodations/adjustments in this course please contact the Student Disability Services Office.

ACADEMIC POLICIES

**Examinations:** The final exam cannot be excused. For all exams you must show a photo ID card. You may use a non-programmable calculator. You cannot use a programmable calculator or phone.

**Exam Absence Policies:** Students who will not be able to take an exam at the scheduled time due to an irresolvable conflict must provide written documentation to verify the conflict. This may occur for students on official university business. The exam will be given at another arranged time before the scheduled test date. Approval must be obtained in advance.

Students who unexpectedly miss an exam due to illness, car accident or similar extreme circumstance should inform their
instructor ASAP. Documentation such as a physician’s note, an accident report, etc. is required and must be attached to an Absence Report Form (obtained from BO 2022). An email to the instructor and a telephone call within 24 hours is expected. In all other cases a missed exam will result in 0 on the exam.

**Academic Dishonesty:** Refer to the university’s policy on Academic Dishonesty in the university catalogue. Violation of this policy can result in a course grade of F with additional university sanctions possible. You will be required to formally acknowledge the terms of our [Academic Honesty Policy](#), by providing a statement through our Blackboard course page.

**COMMUNICATION GUIDELINES**

**Email:** Students are expected to check their UT email account frequently for important course information. This class is being taught for you, so if you are having trouble understanding any aspect of it, please let me know. I am here to help, and will do my best to respond to email within 24 to 48 hours.

**Discussion:** The discussion board is an appropriate way to work with other students to better understand the material. I will monitor these posts, but will not interject in the first few days unless necessary. Keep it professional and constructive.

**Real-Time Communication:** A link to Bb Collaborate, an instant messenger tool, has been added to the Course Menu. We may not be using this tool as part of our course assignments; however, the tool is available for you to use if and when you need it. To that end, I would be happy to arrange a time to meet with you in a chat room if you feel that you have questions that would best be answered in real-time. Conversely, you could also use the tool to meet with fellow students online in order to enhance your understanding of course concepts.

**Netiquette:** It is important to be courteous and civil when communicating with others. Students taking online courses are subject to the communication regulations outlined in the Student Handbook. To ensure your success when communicating online, take time to familiarize yourself with the “dos" and "don'ts" of Internet etiquette: [http://www.albion.com/netiquette](http://www.albion.com/netiquette)

**COURSE EXPECTATIONS**

1. Check Blackboard and your UT email everyday.
2. Participate in discussions on the Discussion Board.
3. Finish assignments in a timely manner.
4. At a minimum answer the assigned Mastering Chemistry questions. There are many problems found throughout the book that should be worked if you are having difficulty with a certain concept.
5. If you need extra help, see your instructor during office hours or use email. You will not be graded or judged based on the questions that you ask! Seek help in the Chemistry Help Center (BO2043). Additional resources are listed on page 9.

**GRADING** It is a very high priority to your instructor to ensure fairness and equity in all grading aspects of the course. There is nothing about this class that requires a certain number of students to get a certain grade. We don’t use a curve, so every one of you can achieve the grade that you are willing to learn!

Course Points The following is the distribution of possible points in the course:
Final Exam 200 pts  50%
Quizzes* 100 pts  25%
Mastering Chemistry (online HW)* 50 pts  12.5%
Participation points* 50 pts  12.5%

Total: 400 pts

* These categories will have extra points available to allow students a chance to reach the total points. However, points added to the total grade will not exceed total points for a category.

The grading scale for this class is:

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<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>100 – 90%</td>
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<tr>
<td>A-</td>
<td>89 – 87%</td>
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<tr>
<td>B+</td>
<td>86 – 84%</td>
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<tr>
<td>B</td>
<td>83 – 78%</td>
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<tr>
<td>B-</td>
<td>77 – 75%</td>
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<tr>
<td>C+</td>
<td>74 – 72%</td>
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<tr>
<td>C</td>
<td>71 – 63%</td>
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<tr>
<td>C-</td>
<td>62 – 60%</td>
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<tr>
<td>D+</td>
<td>59 – 57%</td>
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<tr>
<td>D</td>
<td>56 – 52%</td>
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<tr>
<td>D-</td>
<td>51 – 50%</td>
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<tr>
<td>F</td>
<td>49 – 0%</td>
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**Drop, Withdrawal and Incomplete Grades:** Course drop and withdrawal procedures have been set by the University. Dropped courses do not appear on your transcript. The deadline for dropping is 9/11. You may withdraw from the course and receive a grade of W. The deadline for withdrawal is 11/3. W’s do not affect your GPA.

A course grade of Incomplete is given only to those who have completed all but a small percentage of course requirements for an acceptable reason. The Incomplete must be removed before you take CHEM 1120 – Chemistry for the Health Sciences.

All course points and grades will be frequently updated on blackboard including a midterm grade. Although this is not your final grade in the course, a midterm grade should be taken seriously with respect to how well you are doing in the course approximately half-way through the semester. Note that we do not have any exams until the final (and it makes up almost half of your grade) so your midterm grade is mostly comprised of learning activities such as homework and participation points (it is expected you will earn a majority of both of these categories of points). Since these points are easy to earn this grade might not accurately reflect your level of knowledge in the course material. Use this and look at your quiz score from Mastering Chemistry to help you gauge your level of knowledge, but do realize that if you use your book for the quizzes you will not be able to use your book during the final so even your quiz score might not accurately reflect your understanding of the material.

**STUDENT SUPPORT SERVICES**

Course scheduling assistance: Chemistry Department Secretary, Ms. Samples, is in Room BO 2022, telephone 419-530-2698. If you have further questions or if you need assistance, please talk to her. She takes care of all scheduling changes.

**Chemistry Help Center, Room BO 2043,** is where the teaching assistants hold their office hours so it is a great place to receive assistance. It is generally open all day Monday through Friday & evenings Monday through Thursday. A schedule will be posted early in the term. No appointment is necessary.

**Tutoring** support for all UT students is available through the Learning Enhancement Center located in the Carlson Library.

**Instructor Office Hours** are times when you can stop by my office (no appointment needed) with questions about the course.
material, grades, and any concerns with the course. My office hour times and location are listed at the top of the syllabus (page 1). If you have a scheduling conflict with all of the listed times and want to meet with me we can schedule a different time to meet.

eTutoring Services The Ohio eTutoring Collaborative, in partnership with The University of Toledo, now provides online tutoring support for all UT students. eTutoring Services are offered in a wide array of subjects, including Writing, Math, Calculus, Statistics, Accounting, Biology, Chemistry, and Anatomy and Physiology.
Learn more at: https://www.etutoring.org/login.cfm?institutionid=232&returnPage

eLibrary Services Portal The eLibrary is a customized gateway to UT Libraries for online students. It was designed to help you locate the best online library resources without leaving Blackboard.
Learn more at: http://www.utoledo.edu/dl/students/elibrary.html

Student Disability Services
Student Disability Services provides accommodations and support services to students with disabilities. Learn more at: http://www.utoledo.edu/utlc/accessibility/index.html

Counseling Center
The Counseling Center is the university's primary facility for personal counseling, psychotherapy, and psychological outreach and consultation services. The Counseling Center staff provide counseling (individual and group), mental health and wellness programming, and crisis intervention services to help students cope with the demands of college and to facilitate the development of life adjustment strategies.
Learn more at: http://www.utoledo.edu/studentaffairs/counseling/
Services for Online Students
Knowing what to do, when to do it, and who to contact can often be overwhelming for students on campus - even more so for distance learners. Visit the link below to learn more about the wide range of services for online students.
Learn more at: http://www.utoledo.edu/dl/students/student_serv.html

TECHNICAL SUPPORT
If you encounter technical difficulties with Blackboard, please contact the UT Online Help Desk at (419) 530-8835 or utdl@utoledo.edu. The Help Desk offers extended hours in the evenings and on weekends to assist students with technical problems. When calling after hours, leave a detailed message, including your Rocket Number and phone number, and an Online Learning staff member will respond on the next business day. The UT Online Help Desk website is available at: http://www.utoledo.edu/dl/helpdesk/index.html

Technical questions related to on-campus Internet access, virtual labs, hardware, software, personal website hosting, and UTAD account management can be directed to UT’s IT Help Desk at (419) 530-2400 or ithelpdesk@utoledo.edu. The IT Help Desk website is available at http://www.utoledo.edu/it/CS/HelpDesk.html.

If you encounter technical difficulties with Mastering Chemistry, please contact Pearson Support at http://www.masteringchemistry.com/site/support/faq-students.html

COURSE SCHEDULE The following table (page 10) will give you a general idea of our pace throughout the course. Exams will occur on the dates indicated below. Material covered on each exam will be dependent on the pace of the class and will be specified in lecture prior to each exam. Each chapter listed is consistent with the learning outcomes listed on pages 1-3 of the syllabus. This material will be assessed through Mastering Chemistry online homework, quizzes, and the final exam.
CHEM 1110 – Elementary Chemistry for Health Sciences  
University of Toledo  
TENTATIVE Course Schedule – Spring 2019

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<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Chapter</th>
<th>Notes</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan 15-17</td>
<td>Introduction 1. Chemistry in Our Lives</td>
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<td>2</td>
<td>Jan 22-24</td>
<td>2. Chemistry and Measurements</td>
<td>Last day to drop via web 22 Jan.</td>
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<td>4</td>
<td>Feb 5-7</td>
<td>3. Matter and Energy</td>
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<td>5</td>
<td>Feb 12-14</td>
<td>4. Atoms</td>
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<td>6</td>
<td>Feb 19-21</td>
<td>4. Atoms</td>
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<td>7</td>
<td>Feb 26-28</td>
<td>6. Ionic and Molecular Compounds</td>
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<td>8</td>
<td>Mar 5-7</td>
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<td>Spring Break</td>
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<td>9</td>
<td>Mar 12-14</td>
<td>6. Ionic and Molecular Compounds</td>
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<td>10</td>
<td>Mar 19-21</td>
<td>7. Chemical Reactions and Quantities</td>
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<td>12</td>
<td>Apr 2-4</td>
<td>7. Chemical Reactions and Quantities</td>
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<td>13</td>
<td>Apr 9-11</td>
<td>7. Chemical Reactions and Quantities</td>
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<td>14</td>
<td>Apr 16-18</td>
<td>8. Gases</td>
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<td>15</td>
<td>Apr 15-17</td>
<td>5. Nuclear Chemistry Review</td>
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<tr>
<td>Finals Week</td>
<td>Apr 22-23</td>
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<td>The Final Exam will be comprehensive.</td>
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<td><em><strong>Final Exam</strong></em>*</td>
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<td>YOU MUST TAKE THE FINAL EXAM AT THE TIME</td>
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<td>ASSIGNED TO YOUR LECTURE</td>
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