CHEMISTRY 1A03/1E03 Summer 2017: Information Sheets

These sheets provide answers to most of your questions about the organization of the course. We suggest that, after reading them carefully, you keep them with your notes for future reference. The online version contains useful links and updates.

COURSE OBJECTIVES

Chemistry 1A03/1E03 is an introductory chemistry course intended to:

- discuss chemical concepts, theories and examples of fundamental chemistry
- apply chemistry to current examples within the themes of health, energy, the environment and materials
- help develop skills needed to solve chemical problems (this largely takes place in the tutorials and also during class time)
- provide some experience in the experiment-driven investigation of chemical questions (this largely takes place in the laboratory)

BLENDED LEARNING

CHEM 1A03/1E03 is a blended learning course, and will be taught with a combination of in-class sessions and web modules. Students are responsible for viewing the assigned web modules before each week’s first class, and completing a weekly on-line quiz on the material before coming to class.

Chemistry 1A03/1E03 classes take place Tuesdays and Thursdays from 13:30 to 16:20 pm in BSB 147

INSTRUCTOR

Dr. L. Chen (ABB 159); chenl109@mcmaster.ca

The instructor facilitates the in-class sessions, which include, but are not limited to: presentation of some the course material, interactive activities, demonstrations, and discussion. The instructor is also available for one-on-one discussions during office hours, and monitors the on-line postings. As often as possible he will also visit the labs and tutorials, which are run by graduate and undergraduate teaching assistants.

LABORATORY COORDINATOR

Dr. L.J.M. DAVIS (ABB 121); davislj@mcmaster.ca

The laboratory coordinator coordinates the teaching assistants, labs and tests for all sections of the course. Scheduling, permission and exemption issues for labs or tests should be addressed to her.

ONLINE COURSE MANAGEMENT

CHEM 1A03/1E03 will make use of AVENUE, an integrated set of tools for delivering course components over the Internet. For example, previous years’ tests, personalized quizzes, tutorials, a course bulletin board and other resources will be available. Important announcements and updates are done through Avenue and students are responsible for checking the CHEM 1A03/1E03 page daily.
AVENUE

Since AVENUE courses are maintained in a secure environment on the Internet, only students registered in CHEM 1A03/1E03 have access to the materials. In order to login to AVENUE you need:

1. the internet address: http://avenue.mcmaster.ca/
2. your user name: it is your MacID (if the Registrar has not yet added you to the electronic course list, we will not have your MacID on our database)
3. your password: you will be given a password when you sign-up for your MacID.

AVENUE can be accessed from your home or dormitory room or computer labs/libraries on campus.

Computer lab hours: http://www.mcmaster.ca/uts/lab_facilities/labs/lab_avail/hours.html

If you attempt to login to AVENUE and find that you are not registered under the expected user name and password, follow the steps described on the AVENUE support page. If your registration is delayed and you need early access to the website, contact Dr. Davis. Other AVENUE issues can be addressed to the IT help desk in the Mills library (2nd floor): http://library.mcmaster.ca/content/it-help-desk

WHMIS 1A00

All students taking chemistry courses must complete (or must have previously completed) this safety course presented by Environmental & Occupational Health Support Services (formerly Risk Management). The course is offered through AVENUE. Students not viewing this course should contact EOHSS http://www.workingatmcmaster.ca/eohss/ (eohss@mcmaster.ca, x24352).

OFFICE HOURS

A chemistry tutor is available in the chemistry help centre (ABB 142) for one-to-one and group assistance. There is no charge for this service. Hours will be posted on AVENUE and on the door to the help centre. A tutor will also be available in AVENUE to answer discussion questions and for weekly online chats.

- The Laboratory Coordinator’s office hours will be posted on AVENUE.
- Instructor office hour times to be posted in AVENUE.

LABORATORIES

Lab experiments are 2.5 hours in duration and start during the week of May 8th. Labs are held from 9:30 am – 12:30 pm on Tuesday, Wednesdays & Thursdays. Students will have signed up for a section via MOSAIC. If you need a different section, first visit MOSAIC to check for available space. If none is available, contact the laboratory coordinator as soon as possible with your documented conflict. Specific laboratory rooms will be assigned in Avenue by Monday, May 8th.

Safety: Students must be dressed from “neck-to-wrists-to-toes” in order to safely complete the labs…

- Safety goggles (available at the Campus Store) must be worn at all times in the laboratory. You must have these goggles and your lab books, before your first scheduled lab experiment.
CHEMISTRY 1A03/1E03 Summer 2017: Information Sheets

- Shoes must completely cover your feet. This includes the entire upper foot, toes and heels. Sandals, open-toed shoes, ballerina shoes (flats) and shoes with cut-outs or openings are not acceptable attire. Due to slipping hazards, shoes or boots with heels are strongly discouraged.
- Students must be wearing long pants or a long skirt. Shorts or capris pants are not acceptable attire for a laboratory environment.
- Students must have their arms covered either by wearing a long-sleeve shirt or a lab coat. A lab coat is highly recommended.

Consult AVENUE for information on what you will need before coming to your first laboratory.

All students must watch the Safety Video on AVENUE and pass the safety quiz associated with the video to gain entry to the labs. **THE SAFETY QUIZ will be available ON-LINE UNTIL May 8th.** Students who complete the quiz with a score of 10/10 will receive a 0.5% bonus added to the final course mark

LAB EXEMPTIONS

Any students repeating CHEM 1A03/1E03 and would like to be exempt from the lab program must see the Lab Coordinator by **Friday, May 5th.** The criterion used for lab exemption is two-fold: completion of CHEM 1A03/1E03 or CHEM 1E03 courses at McMaster University within the last 4 years, and completion of all lab experiments. Lab exemption will not be given to students who withdrew from the course. There is no partial exemption for some of the labs. There is no lab exemption granted on the basis of courses taken at another university. If the exemption is granted, the lab mark obtained previously will be used to calculate your final mark. Students must see the Lab Coordinator in ABB 121 to be granted a lab exemption.

TUTORIALS

**Weekly tutorials/help center** are run by teaching assistants and concentrate on the development of problem-solving skills. **They are scheduled Tuesday and Thursday 4:30 – 5:20 pm.** Tutorials will begin Thursday May 4th and take place in **ABB 142.**

Tutorial questions and other resources will be found on AVENUE. If you wish to work on the tutorial questions, you must access and print them before attending a tutorial session. The solutions to tutorial questions will be posted on AVENUE at the end of each week.

MASTERING CHEMISTRY

CHEM 1A03/1E03 will make use of Mastering Chemistry for online homework assignments (HW). Mastering Chemistry provides tutorial style problems providing built-in hints based on student response (if incorrect). Access to Mastering Chemistry is bundled in the NEW textbook package or available separately through the Mastering Chemistry widget on the AVENUE homepage for this course. More information will be provided in class. Participation in the Mastering Chemistry homework assignments is **strongly recommended**, although optional (see final mark calculation). There are six personalized HW assignments during the term. Answers for each homework assignment are entered via Mastering Chemistry. Homework not submitted by the due date and time will not be marked. The 4 assignments with the highest grades will be used in your final grade calculation. Homework assignments must be submitted **before 11:59 pm** on the dates shown in the schedule on page 10.
iCLICKER & REEF POLLING
The instructor will use the iClicker classroom response system for in-class questions. These questions will be graded, and may contribute up to 2% to your final grade. Participation in the iClicker questions is highly recommended although optional (see p. 5). Your grade on these questions will be derived as follows:

<table>
<thead>
<tr>
<th>% of questions correctly answered</th>
<th>Grade out of 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>80-100</td>
<td>2.0</td>
</tr>
<tr>
<td>65-79</td>
<td>1.5</td>
</tr>
<tr>
<td>50-64</td>
<td>1.0</td>
</tr>
<tr>
<td>40-49</td>
<td>0.5</td>
</tr>
<tr>
<td>&lt; 40</td>
<td>0.0</td>
</tr>
</tbody>
</table>

The purpose of these questions is to address common course concepts and to encourage pre-class preparation and in-class engagement. Your instructor will provide more information in class on the use of iClickers and how to register your iClicker wand (available at the campus store) OR how to use Reef Polling and your mobile device to participate in this component.

QUIZZES, TESTS, AND EXAMINATIONS

- **Quizzes:** Six timed quizzes (60 min) are available during the term. Access to the timed quizzes is available from Sunday at 9:00 am until Monday at 11:59 pm. Quizzes start May 8th and continue weekly for the rest of the term. See the course calendar on pg. 10 for a summary of all due dates. The top 5 of 6 marks are counted towards your final grade.

- **Term tests:** will be held on the following days:
  - Test 1: Tuesday, May 16th, in class, 90 minutes, BSB 147
  - Test 2: Tuesday, June 6th, in class 120 min, BSB 147

  Pre-existing conflicts should be discussed with the course coordinator a minimum of 1 week in advance of the test date.

- **Final Examination (2.5 hours):** is scheduled for Thursday, June 15th, in class, in BSB 147 and will test all course content from the term. This examination must be written in order to pass the course.

REQUESTS FOR RELIEF OF MISSED ACADEMIC TERM WORK

If you are absent from the university for a minor medical reason, lasting fewer than 3 days, you may report your absence, without documentation, using the McMaster Student Absence Form (MSAF). Absences for a longer duration or for other reasons must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, report your absence to davisj@mcmaster.ca. Then contact the Laboratory Coordinator immediately (normally within 2 working days) in-person in ABB 121 to learn what relief may be granted for the work you have missed.

Students must complete a minimum of 75% of the course work to obtain credit for CHEM 1A03/1E03. This 75% must include the final exam and laboratory components. There are no make-up quizzes or tests. Missed labs must be completed at a later time (scheduled at the end of term) to obtain credit.
CHEMISTRY 1A03/1E03 Summer 2017: Information Sheets

The MSAF on-line, self-reporting tool cannot be used to apply for any missed final examination or its equivalent. See Petitions for Special Consideration in the Undergraduate Calendar.

CALCULATORS

The two term tests and the final examination all require a calculator. THE ONLY ACCEPTABLE CALCULATOR IS THE CASIO FX 991 available at the Campus Store. NO OTHER CALCULATOR IS PERMITTED DURING TESTS AND EXAMS.

CALCULATION OF FINAL MARK FOR THE COURSE

Because the Mastering Chemistry and iClicker components of the course may be considered optional, for each student the final grade will be calculated according to each of the four weighting options shown below, and each student will receive the highest grade of the four calculated grades. In this way a grade may include either, both or neither of the Mastering Chemistry and iClicker components.

<table>
<thead>
<tr>
<th>Course Component</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
<th>Option 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>iClicker Questions</td>
<td>2%</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>Avenue Quizzes</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Mastering Homework</td>
<td>3%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Labs</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Term Test 1</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Term Test 2</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
<td>42%</td>
<td>43%</td>
<td>45%</td>
</tr>
<tr>
<td>Cumulative</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mandatory/Cumulative</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Note 1: Students must complete and submit a report for a minimum of 4 laboratory experiments to pass the course.

Note 2: Students must complete a minimum of 75% of the course work to obtain credit for CHEM 1A03. This 75% must include the final exam and laboratory components.

Note 3: The instructor(s) and university reserve the right to modify elements of the course during the term. The university may change dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

REQUIRED ITEMS

- The Textbook for the course is General Chemistry, 11th edition, by R.H. Petrucci. The text is bundled with a solutions manual and online access to Mastering Chemistry/self-study area. This package can be purchased at the Campus Store.
- Course Notebook: Available for purchase from the Campus Store
- CHEM 1A03/1E03/1AA3 2016-2017 Laboratory Manual: (Hayden – McNeil) with carbonless sheets must be purchased from the Campus Store. No other manuals will be acceptable.
- Safety goggles: may be purchased from the Campus Store. Lab coats are strongly recommended.
ALSO RECOMMENDED

- **i-Clicker** classroom response system can be purchased from the Campus Store. (~$40, includes 6-month subscription to REEF Polling) OR students may use their mobile device after subscribing to the REEF Polling program; [https://app.reef-education.com/#/login](https://app.reef-education.com/#/login)
- Access code for the My-Lab & Mastering Chemistry website (bundled with new text packages) or available through the Mastering Chemistry widget on the CHEM 1A03/1E03 AVENUE page.

COURSE CONTENT

The Chapters and Sections listed below, as well as additional material used in class to support the themes of health, energy the environment and materials and the labs, form the course content. This material will be covered in the online modules, classes, homework, quizzes, labs, term test and final examination. The sections listed below represent a guideline, correlating course and textbook content. The textbook is best used as a reference to support learning. All chapter sections indicated are as found in Petrucci, General Chemistry, 11th edition. Those who may be using Petrucci, General Chemistry, 10th edition should use the chapter headings and the table of contents to identify the corresponding chapters and sections. **Laboratory Experiments are a formal part of the course content.** The quizzes, term test and final examination may include questions related to the laboratory material

**Unit 1: Introduction**
Content from this Unit serves as an introduction to the course and is not part of the learning objectives.

**Unit 2: Fundamental Skills Review**
A selection of concepts from chapters 1, 2, 3, 4, and 6 will be presented to review fundamental concepts needed throughout the remainder of the course material. Specific topics reviewed will be indicated in the online modules.

**Unit 3: Atomic Structure and Theory**
**Chapter 8 Electrons in Atoms**
- 8-1 Electromagnetic Radiation
- 8-2 Prelude to Quantum Theory (excluding Atomic Emission Spectra)
- 8-3 Energy Levels, Spectrum, and ionization Energy of the Hydrogen Atom
- 8-6 Quantum Theory of the Hydrogen Atom (exclude the Schrodinger Equation)
- 8-8 Electron Spin: A Fourth Quantum Number
- 8-10 Electron Configurations
Plus selected concepts from sections 8.7 & 8.9

**Unit 4: Periodic Trends**
**Chapter 9 The Periodic Table and Some Atomic Properties**
- 9-2 Metals and Nonmetals and Their Ions
- 9-3 Sizes of Atoms and Ions*
- 9-4 Ionization Energy
- 9-5 Electron Affinity
- 9-6 Magnetic Properties
- 9-7 Polarizability
Pg 420-424 Electronegativity
Note *On page 387 there is some discrepancy with content in the modules. When in doubt, the modules should be followed

**Unit 5: Chemical Bonding**
**Chapter 10 Chemical Bonding I: Basic Concepts**
- 10-1 Lewis Theory: An Overview
- 10-2 Covalent Bonding: An Introduction
- 10-3** Polar Covalent Bonds and Electrostatic Potential Maps
- 10-4 Writing Lewis Structures
- 10-5 Resonance
- 10-6 Exceptions to the Octet Rule
- 10-7 Shapes of Molecules
- 10-8 Bond Order and Bond Lengths
- 10-9 Bond Energies
Note **In section 10-3, Electrostatic–potential maps will not figure in term tests or the final examination.

**Unit 6: Solubility and Chemical Equilibrium**

**Chapter 5 Introduction to Reactions in Aqueous Solutions**

5-1 The Nature of Aqueous Solutions
5-2 Precipitation Reactions

**Chapter 15 Principles of Chemical Equilibrium**

15-1 The Nature of the Equilibrium State
15-2 The Equilibrium Constant Expression
15-3 Relationships Involving Equilibrium Constants
15-4 The Magnitude of an Equilibrium Constant
15-5 Predicting the Direction of Net Chemical Change
15-6 Altering Equilibrium Conditions: Le Châtelier’s Principle
15-7 Equilibrium Calculations: Some Illustrative Examples

**Unit 7: Acid-Base Chemistry**

**Chapter 5 Introduction to Reactions in Aqueous Solutions**

5-3 Acid-Base Reactions

**Chapter 16 Acids and Bases**

16-1 Acids, Bases, and Conjugate Acid-Base Pairs
16-2 Self-Ionization of Water and the pH scale
16-3 Ionization of Acids and Bases in Water
16-4 Strong Acids and Strong Bases
16-5 Weak Acids and Weak Bases
16-8 Ions as Acids and Bases
16-10 Molecular Structure and Acid-Base Behavior
16-11 Lewis Acids and Bases

**Unit 8: Thermodynamics**

**Chapter 7 Thermochemistry**

7-1 Getting Started: Some Terminology
7-2 Heat
7-3 Heats of Reaction and Calorimetry
7-4 Work
7-5 The First Law of Thermodynamics
7-6 Application of the First Law to Chemical and Physical Changes

**Unit 9: Entropy and Free Energy**

**Chapter 7 Thermochemistry**

7-10 Spontaneous and Nonspontaneous Processes: An Introduction

**Chapter 13 Spontaneous Change: Entropy and Gibbs Energy**

13-1 Entropy: Boltzmann’s View
13-2 Entropy Change: Clausius’s View
13-3 Combining Boltzmann’s and Clausius’s Ideas: Absolute Entropy
13-4 Criterion for Spontaneous Change: The Second Law of Thermodynamics
13-5 Gibbs Energy Change of a System of Variable Composition: \( \Delta G \) and \( \Delta_r G \)

**Unit 10: Electrochemistry**

**Chapter 5 Introduction to Reactions in Aqueous Solutions**

5-4 Oxidation-Reduction Reactions: Some General Principles
5-5 Balancing Oxidation-Reduction Equations
5-6 Oxidizing and Reducing Agents

**Chapter 19 Electrochemistry**

19-1 Electrode Potentials and Their Measurement
19-2 Standard Electrode Potentials
19-3 \( E_{cell}, \Delta G, \) and \( K \)
19-4 \( E_{cell} \) as a Function of Concentrations

Your Instructor will provide more detail about the course content. Please refer to the posted learning objectives for each topic.
SENATE POLICY STATEMENTS

All students should read and become familiar with the Statement on Student Academic Responsibility and the Academic Integrity Policy as found in the Senate Policy Statements distributed at the time of registration and available in the Senate Office. Any student who infringes on these resolutions will be treated according to the published policy.

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty.

The following illustrate only four of many forms of academic dishonesty:

- Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained;
- Copying or using unauthorized aids in the laboratory exercises;
- Improper collaboration on group or individual work;
- Copying or using unauthorized aids during tests and examinations.

Copyright Policy: In this course you will have access to material that is subject to copyright laws. This includes (but is not limited to) the textbook, solutions manual and all resources developed by the instructors such as lab manuals, demonstration videos, quizzes, assignments, tutorials, tests, class notes, class slides and web modules. Under no circumstance are you allowed to share or redistribute this material in any printed or electronic form without the explicit written consent of the copyright holder. This includes posting any course material on Internet bulletin boards, course repositories, social networks, etc.

DISCRIMINATION POLICY

McMaster University is concerned with ensuring an environment that is free of all adverse discrimination. If there is a problem that cannot be resolved by discussion among the persons concerned, individuals are reminded that they should contact their Department Chair, or Human Rights & Equity Services, as soon as possible. Issues involving teaching assistants should also be brought to the attention of the Lab Coordinator.

STUDENT RESOURCES

There are many opportunities for students seeking any number of help opportunities while enrolled at McMaster. Please make yourself familiar with the services offered on campus.

**Student Success Center** which is on campuse to engage students and alumni in diverse learning opportunities to support their academic, personal and professional growth: [http://studentsuccess.mcmaster.ca/](http://studentsuccess.mcmaster.ca/)

**Student Wellness** providing counseling and medical services including wellness education: [http://wellness.mcmaster.ca/](http://wellness.mcmaster.ca/)

**Student Accessibility Services** offers various supports for students with disabilities: [http://sas.mcmaster.ca/](http://sas.mcmaster.ca/)
FINDING CHEMISTRY ON CAMPUS

All lectures are held in the Burke Science Auditorium, BSB/147. Labs, tutorials and all staff and instructors’ offices are in the Arthur Bourns Building ABB (building 25). This building also houses the main Chemistry office (ABB 156), the chemistry tutorial room (ABB 136) and the Chemistry Help Centre (ABB 142).

You will find a lot of recent construction around campus. Do not be surprised to find new wings and new buildings, not shown on the latest maps.
### Chemistry 1A03/1E03 Schedule: May – June 2017

<table>
<thead>
<tr>
<th>Week #</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Add/Drop Ends - HW 1 open</td>
</tr>
<tr>
<td></td>
<td>Week 1</td>
<td>Classes Begin</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Review tutorial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Week 2</td>
<td>Quiz 1 Due 11:59 pm</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Exp 1 Tutorial I</td>
<td></td>
<td></td>
<td></td>
<td>HW 1 Due - HW 2 Open</td>
</tr>
<tr>
<td></td>
<td>Week 3</td>
<td>Quiz 2 Due 11:59 pm</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Exp 2 Tutorial II</td>
<td><strong>Test 1: in class</strong></td>
<td></td>
<td></td>
<td>HW 2 Due - HW 3 Open</td>
</tr>
<tr>
<td></td>
<td>Week 4</td>
<td>Quiz 3 Due 11:59 pm</td>
<td>22</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Exp 3 Tutorial III</td>
<td></td>
<td></td>
<td></td>
<td>HW 3 Due - HW 4 Open</td>
</tr>
<tr>
<td>June</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Week 5</td>
<td>Quiz 4 Due 11:59 pm</td>
<td>29</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Exp 4 Tutorial IV</td>
<td></td>
<td></td>
<td></td>
<td><strong>Last day to cancel course without failure</strong></td>
</tr>
<tr>
<td></td>
<td>Week 6</td>
<td>Quiz 5 Due 11:59 pm</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Exp 5 Tutorial V</td>
<td><strong>Test 2: in class</strong></td>
<td></td>
<td></td>
<td>HW 5 Due - HW 6 Open</td>
</tr>
<tr>
<td></td>
<td>Week 7</td>
<td>Quiz 6 Due 11:59 pm</td>
<td>12</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Makeup Labs Tutorial VI</td>
<td>Make-up lab</td>
<td></td>
<td>Make-up lab</td>
<td><strong>Exam: in class</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HW 6 Due</td>
</tr>
</tbody>
</table>

HW = Mastering Chemistry Homework Assignment