COURSE DESCRIPTION AND PREREQUISITE SKILLS: Chemistry 103, section U020, is an accelerated (7 week) course. This introduction the chemistry is intended for non-science students who have an interest in science. No prior chemistry instruction is required or assumed but the course should also appeal to those who have had high school chemistry. Topics included this semester are chemical bonding, nuclear chemistry, organic chemistry, biochemistry and medicinal chemistry.

LEARNING GOALS: We live in a dynamic chemical universe where chemical properties and reactions influence our every action. More than 4,000 chemicals circulate in the blood of every human; our very lives depend on the reactions that use them to sustain our bodies. We rely upon chemical properties and reactions to support and enrich our lives in other ways. This course is intended to provide an introduction to the role of chemistry in our world, providing a rational basis for interpreting and predicting chemical phenomena through examples of chemical behavior observed in nature. Thus, students will be able to understand the selected chemical processes and to apply this understanding to solve new problems in the properties and reactions of chemicals.

The lectures and textbook are designed to explore chemical ideas in the context of real-world problems. The aim is to give students the background to understand the scientific and societal issues behind issues of current importance.

RESIDENCY LECTURES AND LABS: Attendance at these Lectures and Labs is required – no exceptions.

The material covered in residency lectures will be illustrative rather than exhaustive. In lecture, alternate ways of understanding the material will often be presented. Students will perform two laboratory experiments during the residency. The intent of the residency lectures is to provide a background from which to launch
self-investigations of the technical aspects of the chemistry contained in the textbook (and also additional optional readings). Significant amounts of time will be allowed for questions and discussion of the topics. You will also be introduced to the MasteringChemistry website for online homework, and the online Blackboard website for announcements, directions for lab experiments, and grading.

**Lectures and Labs 9/12 and 9/13 (1:00 pm to 6:00 pm).** The lectures will be followed by laboratory sessions.

**Lecture Room:** 100 Life Sciences Building

**Lab Room:** 004 LSB (basement level)

**ONLINE HOMEWORK:** You will have online homework due one week after each lecture has been posted on Blackboard. When you purchase the required textbook (see next page) you will get an online access code, which you will use to open the MasteringChemistry website. The website will give the schedule for online tutorials, homework, and self-tests.

**LABORATORY EXPERIMENTS:** Chemistry is an experimental science, so you will be completing at least eight laboratory experiments, two during the residency in the Syracuse University Chemistry labs, and six at home using commonly available materials. It is very important that you use caution, both at SU and at home, in completing these experiments - remember, Safety First!!

During the residency you will perform two laboratory experiments: *Archimedes: Our Hero* and *The Vitamin C Clock Reaction*. You will collect data and make observations during the residency and then complete the laboratory reports and send them (electronically via email) to Prof. Borer. Details will be provided on background, experimental procedures, and the format for reports. Reports usually consist of completed data sheets and post-laboratory reports. Both reports must be emailed to Prof. Borer (pnborer@syr.edu) on or before September 26, 2015.

At home you will complete three specific laboratory experiments using materials commonly available either at home or from the grocery store. For each, you will complete the experiment and then send to Prof. Borer the completed reports (electronically via email). These experiments (all available on Blackboard) are:

- **CHOOSE THREE:**
  - Paper Chromatography
  - Home Acid Base Chemistry
  - DNA: The Genetic Record
  - Analyzing PseudoScience

The reports for these three labs must be emailed to Prof. Borer (pnborer@syr.edu) on or before October 17, 2015. You will also select and complete three additional labs of your choice at home based upon the experiments found at:

http://scifun.chem.wisc.edu/homeexpts/homeexpts.html

For each of these last three experiments, you will need to provide a write-up that is clearly labeled and with the following sections completed (in your own words): (1) Introduction and background, (2) Objective of the experiment (3) Equipment and chemicals used, (4) Procedures employed, (5) Observations, and (6) Conclusions. Email these reports to Prof. Borer (pnborer@syr.edu) on or before October 31, 2015.

**FINAL EXAM:** You will be given a Final Exam on Friday, October 30; you will be given two hours, although you may be able to complete it in less time. A practice exam and answer key will be posted on the course website by October 23.
**Location for the final exam:** Many students will take the exam at Syracuse University – the start time will be 2:30 PM or later, at a time and place to be announced.

If it is inconvenient for you to go to SU, you must find a proctor to administer the exam at 2:30 PM or later on Friday, Oct-30. The proctor can be a teacher at a college or high school near you, and s/he must have access to email to send a copy of your answer sheet to Prof. Borer before 10:00 AM on Saturday, Oct-31. You must find a proctor well in advance of the exam; email the following information to Prof Borer before 5:00 PM Friday Oct-16: Proctor’s full name, place of employment, job description, email address, and contact phone numbers (including cell phone if available). Prof. Borer will contact the proctor directly with further information about the exam.

**Grading:** Final grades will be based upon completion of the online homework (40% of final grade, due periodically during the semester), the final exam (20%), and the laboratory reports (40%).

Materials should be submitted to Prof. Borer by email in either pdf or MS Word formats. Send assignments by email to pnborer@syr.edu. Late assignments due before the end of the term will be docked by 10% for each day they are late, up to a maximum of 50% off.

*Anything received after Oct. 31 will receive a grade of zero – no exceptions!*

Prof. Borer must submit final course grades to the registrar on Nov. 3. This is a University deadline and cannot be extended. *None of the assignments will be accepted after Oct. 31; this includes the online homework, final exam, and lab reports.*

**Required Textbooks:** The required textbooks for this course are:

*Conceptual Chemistry: Understanding Our World of Atoms and Molecules* by John A. Suchocki (2013, 5th Edition) and

*MasteringChemistry* with eText and Access Card to accompany the Suchocki text 9780321803207; that is the correct ISBN for the text with e-book 9780321807816; access code with e-book to be ordered via bookstore.

**Miscellaneous:**

1. Students who may need special consideration due to a physical or learning disability should email Prof. Borer as soon as possible – no later than Sep. 15.

2. The internet has made it easy to “cut and paste” material into papers and reports. I will submit many of the documents that you send me to a plagiarism detection program that identifies “matched text.” I will then interpret the originality of your document, based on your writing capability and writing style. If I judge that you have plagiarized text from another source, I may give you a grade of zero for that report or paper. Therefore, be sure to reference any material that you use from another source by footnotes or quotation marks. Also, do not to copy any section of a report from another student.
# CHEMISTRY 103

## Approximate Course Schedule

Professor Philip N. Borer, Fall 2015  
REVISED Aug. 5, 2015

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Text</th>
<th>Homework Problems Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sat., Sep. 12</td>
<td>Introduction, opening lectures and lab introductions; Rm 100 LSC</td>
<td>Chapter 1</td>
<td></td>
</tr>
<tr>
<td>Sun., Sep. 13</td>
<td>LSC Lecture and Labs, Rm 100 LSC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fri., Sep. 18</td>
<td>&quot;About Science&quot;</td>
<td>Chapter 1</td>
<td>Chapt. 1: 1, 2, 3, 6, 7, 9, 14, 16, 18, 22, 24, 26, 28, 32, 34, 38, 40, 42, 50</td>
</tr>
<tr>
<td>Fri., Sep. 25</td>
<td>&quot;Particles and Matter&quot;</td>
<td>Chapter 2</td>
<td>Chapter 2: 1, 2, 6, 7, 8, 9, 10, 11, 12, 14, 15, 18, 20, 22, 26, 30, 32, 38, 40, 44, 45, 48, 50, 54, 56, 60, 62, 66, 68, 72, 78</td>
</tr>
<tr>
<td>Fri., Oct. 2</td>
<td>&quot;Elements of Chemistry&quot;</td>
<td>Chapter 3</td>
<td>Chapter 3: 1, 2, 3, 4, 5, 9, 10, 11, 12, 14, 15, 18, 36, 38, 40, 43, 44, 52, 54, 56, 58, 62, 68, 70</td>
</tr>
<tr>
<td>Fri., Oct. 9</td>
<td>&quot;The Atomic Nucleus&quot;</td>
<td>Chapter 5</td>
<td>Chapter 5: 1, 2, 4, 6, 8, 10, 12, 15, 18, 20, 29, 30, 33, 38, 46</td>
</tr>
<tr>
<td>Fri., Oct. 9</td>
<td>&quot;How Molecules Mix&quot;</td>
<td>Chapter 7</td>
<td>Chapter 7: 1, 6, 7, 8, 9, 14, 17, 18, 20, 32, 36, 60, 66</td>
</tr>
<tr>
<td>Fri., Oct. 16</td>
<td>&quot;Nutrients of Life&quot;</td>
<td>Chapter 13</td>
<td>Chapter 13: 2, 3, 4, 6, 8, 10, 11, 14, 15, 16, 22, 24, 35, 38, 40, 41, 42, 57, 64, 69</td>
</tr>
<tr>
<td>Fri., Oct. 23</td>
<td>&quot;Medicinal Chemistry&quot;</td>
<td>Chapter 14</td>
<td>Chapter 14: 1, 2, 4, 7, 8, 10, 11, 12, 14, 18, 19, 22, 23, 24, 33, 35, 36, 37, 40, 66, 68</td>
</tr>
<tr>
<td>Fri., Oct. 30</td>
<td>Proctored Final Exam</td>
<td>Covers chapters 1-5, 7, 13, 14</td>
<td></td>
</tr>
</tbody>
</table>

## Course Grades are Due Nov. 3 so no extensions are possible.

The three at-home Laboratory Reports are Due Oct. 31. Due dates for online homework will be posted on the website for MasteringChemistry.
Safety is the MOST important issue that you will deal with this semester. Take the laboratory and its risks seriously. Understanding these risks and minimizing them is the best way to avoid accidents. If you follow these guidelines and stay alert to possible hazards, your experience in this course should be a safe one.

SAFETY GLASSES MUST ALWAYS BE WORN IN LAB!!

**Hazards** - The main potential hazards in the laboratory are fire and exposure to toxic and/or reactive substances. Though toxicity and reactivity of compounds varies tremendously, an excellent policy is to handle EVERY chemical with respect and caution. Be aware that you may be exposed to chemicals in several ways: inhalation, skin contact (some chemicals go right through the skin), and ingestion.

In case an accident occurs, report it immediately! Do not try to hide anything out of embarrassment - you will be making the situation worse, endangering yourself and others. Let the instructors decide on the proper course of action. Those not involved should clear the area.

The following is taken in part from "The Organic Chem Lab Survival Manual", by James W. Zubrick. Please excuse the jokes he uses, I will not claim any responsibility for them.

**SAFETY FIRST, LAST, AND ALWAYS**

Disobeying safety rules is not at all like flouting many other rules. You can get seriously hurt. No appeal. No bargaining for another 12 points so you can get into medical school.

1. Find out how you would get medical help, if you needed it. (The stockroom has limited first aid; otherwise have your T.A. call the Health Center/Public Safety from the stockroom.)
2. Always wear your goggles. Eye injuries are extremely serious, but they can be mitigated or prevented if you keep your goggles on at all times. There are several types of eye protection available, some acceptable, some not, according to the local, state, and federal laws. I like the clear plastic ones that leave an unbroken red line on your face when you remove them. Sure they fog up a bit, but the protection is superb. Also, think about getting chemicals, or chemical fumes trapped under your contact lenses. Then don't wear them to lab. Ever.
3. Touch not thyself. Not a biblical injunction, but a bit of advice. You may have gotten chemicals on your hands, in a concentration that is not noticeable. Sure enough, up go the goggles for an eye wipe with the fingers. Enough said.
4. There is no "away". Getting rid of chemicals is a very big problem. (Throw all waste in appropriately labeled jars)
5. Bring a friend. If you have a serious accident when you are all by yourself, you might be unable to get help before you fall over. Don't work alone; don't work at unauthorized times.
6. Don't fool around. Chemistry is a serious business. Don't be careless or clown around the lab. You can hurt yourself or other people. Try not to be somber about it; just serious.
7. Drive defensively. Work in the lab as if someone else were going to have an accident that might affect you. Keep the goggles on because someone else is going to point a loaded, boiling test tube at you. Someone else is going to spill hot, concentrated acid on your body. Get the idea?

8. Eating, drinking, smoking in the lab. Are you kidding? Eat in a chem lab?? Drink in a chem lab?? Smoke, and blow yourself up!!!!

9. Keep it clean. Work neatly. You don't have to make a fetish out of it, but try to be neat. Clean up spills. Turn off burners or water or electrical equipment when not in use.

10. Where it's at. Learn the location and proper use of the fire extinguishers, fire blankets, safety showers, and eyewashes.

11. Make the best-dressed list. No open-toed shoes, or sandals. No loose-fitting cuffs on pants or shirts. Keep the midsection covered. Tie back that long hair. A small investment in a lab coat can pay off, projecting that professional touch. It gives a lot of protection.

ACCIDENTS WILL NOT HAPPEN

That's the attitude you should hold while working in the laboratory. You are NOT going to do anything, or get anything done to you, that will require medical attention. If you do get cut, and the cut is not serious, wash the area with water. If there's serious bleeding, apply direct pressure with a clean, preferably sterile dressing. For a minor burn, let cold water run over the burned area. For chemical burns to the eyes or skin, flush area with lots of water. Always see a physician for serious cuts or burns.

If you have an accident, tell your instructor immediately. Get help! This is no time to worry about your grade in lab. If you put your grades ahead of your personal safety, be sure to see a psychiatrist after the physician finishes.
CHE 103: Safety Agreement

While in the CHE 103 chemistry lab, I agree to follow the safety standards outlined by my instructor. This includes but is not limited to the following:

1. I must wear SAFETY GOGGLES and LAB GLOVES that are approved by my instructor.
2. I must wear clothing that complies with the safety standards outlined by your instructor and/or teaching assistant. This includes, but is not limited to the following:
   - I must not wear shorts or a short skirt.
   - I must not wear contact lenses.
   - I must not wear open-toed shoes and/or have bare feet in the lab.
   - I must not wear loose clothing and must tie back any long hair.
3. I must read through the experiment before coming to lab and ask my instructor questions if I am unclear on any parts of the procedure.
4. I must not eat or drink in the CHE 103 lab. I also agree not to bring any food or drinks into the lab.
5. I must know the location of and how to use the safety equipment in the laboratory. This includes, but is not limited to the following: fire extinguishers, fire blankets, fire alarms, lab telephone, emergency exits, eye wash, and emergency showers.
6. I must turn my cellphone off. I also agree to store it with any other personal materials not being for the CHE 103 class in an area designated by my instructor that is away from the laboratory working area.
7. I must only work in the lab when the instructor is present in the lab.
8. I must clean up my work area and dispose of chemical waste according to the instructions provided by my instructor.
9. I must avoid touching hazardous objects and/or chemicals.
10. I must inform my instructor immediately of any dangerous situations and/or accidents in the CHE 103 lab.
11. I must wash my hands with soap and water before leaving the CHE 103 lab.

By signing this, I declare that I have read this safety agreement and agree to follow these safety rules in the CHE 103 laboratory. I also declare that I will follow any additional safety instructions provided by my instructor in the CHE 103 laboratory. I also agree that my instructor and/or teaching assistant reserves the right to have me leave the laboratory if I do not conform to these safety standards.

_______________________________________________ _________________________________
Student’s Name (Printed)      Lab Section and Meeting Time

_______________________________________________ _________________________________
Student’s Signature (agreeing to abide by this agreement)  Date
Academic Integrity Agreement

Students enrolled in CHE 103 are expected to exhibit honesty in all academic endeavors. Cheating in any form will not be tolerated. See http://academicintegrity.syr.edu for the complete Syracuse University Academic Integrity Policy.

Students work in groups in the lab, but are expected to submit their own answers to their Pre-Lab Assignments and Post-Lab Questions. While students are allowed to discuss lab reports and question sheets, all submitted assignments must be the work of the individual student and may not be copied from another student’s work or any other source. Unless otherwise authorized by the Instructor and/or Teaching Assistant, work submitted must be based on the experimental findings of the individual student during the current semester.

The penalty imposed for academic integrity violations in CHE 103 is a grade of zero on the assignment and/or a failing grade (F) for the course.

Examples of academic dishonesty in CHE 103 include, but are not limited to:

- copying Pre-Lab Assignment(s) or Post-Lab Question(s).
- allowing another student to copy your Pre-Lab Assignment(s) or Post-Lab Question(s).
- falsifying experimental data.
- using someone else’s data, unless instructed to do so by the Instructor and/or Teaching Assistant.
- submitting work from a prior semester, whether yours or that of another student.
- modifying and resubmitting graded assignments in order to get more credit.

I have read and understand the academic integrity policies of Syracuse University and CHE 103, as described above, in the syllabus, and at http://academicintegrity.syr.edu/. I agree to abide by these policies.

Name (printed): ___________________________    Section: ________________

Signature: _________________________________    Date: ________________