Text: There will be no textbook for this course, you will need to provide a standard black composition book to keep all of your lab records. All lab procedures, lab report forms, data sources, and supplemental material will be available in OAKS.

Students will need to provide a lab coat, disposable gloves, and a calculator. The department provides safety goggles, but students may prefer to wear safety glasses approved for chemistry labs that are available in the bookstore.

Course description and learning outcomes: Chemistry lab is an interesting experience when carried out in a safe and knowledgeable manner. The goal of this course is to increase student's enthusiasm and to improve their laboratory technique as well as to supplement the information gained in lecture. Areas of focus include measurement of chemical kinetics, chemical equilibrium and acid base chemistry, thermodynamics, electrochemistry, and materials science. The specific learning outcomes for the class are to:

- Develop an understanding of the scientific method in a chemistry laboratory setting
- To explain and apply the theory behind the methods employed in the laboratory.
- To demonstrate techniques capable of obtaining precise and accurate results in the laboratory
- To compute stoichiometric, concentration, and calculations involving spectroscopic techniques.
- Employ mathematical manipulations using acquired data
- Interpret scientific data

This course provides opportunities for open ended analysis and evaluation of experimental results, so there will be a great deal of emphasis on proper methods for collecting lab results, analyzing the data and the interpretation of data. Students are expected to come to each lab on time and be prepared to carry out the day’s tasks. The 1-credit lab course is a co-requisite of the 3-credit lecture course. Should either course be dropped, both must then be dropped.

Class General Objectives: While there are specific technical objectives for this class, there are also additional goals that need to be addressed. This course is part of a larger educational experience, and as such we will attempt to align the course with the overall vision for the college, as stated in the core purpose and values of the College:

- To pursue and share knowledge through study, inquiry and creation in order to empower the individual and enrich society.
- EDUCATIONAL EXCELLENCE that furthers intellectual, creative, ethical and social development through a broad range of programs centered on the liberal arts and sciences.
- STUDENT-FOCUSED COMMUNITY that embraces mutual respect, collaboration and diversity for the welfare of the individual and the institution.
- THE HISTORY, TRADITIONS AND ENVIRONMENT OF CHARLESTON AND THE LOWCOUNTRY that foster distinctive opportunities and relationships that advance our public mission in the city of Charleston, state of South Carolina, and the world.
**Safety:** Safety is of prime concern. During the first lab period, each student will be required to sign a safety sheet to acknowledge awareness of the departmental safety policies and scientific integrity discussion to acknowledge awareness of the departmental policies regarding the application of the honor code to this course and the co-requisite lecture. Safety information about the chemicals used in this laboratory course is available in the yellow MSDS binders in the lab room and can also be found online on a number of sites, like http://www.msdss.com/. Other sites for MSDS sheets can be found by searching "MSDS" on Google™. Students must bring their own lab coats and gloves to wear when doing reactions with strong acids, oxidizing agents or other harsh chemicals. Wear clothing appropriate to the lab each week, including long pants, as well as shoes that cover your entire foot. Old clothes, that may be discarded if damaged, are recommended.

Failure to conduct yourself in a safe manner may result in your being asked to depart from a particular laboratory period for which you will be assigned a grade of zero.

**Honor Code:** Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved.

Incidents where the instructor determines the student’s actions are related more to a misunderstanding will handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student’s file.

Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student’s transcript for two years after which the student may petition for the X to be expunged. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

Students should be aware that unauthorized collaboration--working together without permission--is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others’ exams, fabricating data, and giving unauthorized assistance.

Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor.

Students can find the complete Honor Code and all related processes in the Student Handbook at http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php

**Attendance:** Attendance to the scheduled lab section is required. Attendance to your section of scheduled lab is required. The grade of "WA" will be used in this course for any student who misses more than three laboratory periods. Students who miss quizzes or labs (including the final exam lab) will be given a grade of "0" for the associated evaluations. You are responsible for learning the required material and performing the required experiments. If you miss a lab due to illness or without prior approval from your instructor you will not be allowed to make up the missed lab. However, if you have a planned absence (due to your official representation of the College off campus or for another reasonable cause) please let me know well in advance and we will work
with you to try to make an accommodation that will allow you to make up the missed lab. You may not make up labs due to illness or unscheduled absences. When your final course grade is calculated, your lowest lab report and quiz grade will be dropped, with the exception of the final exam labs. If you miss a second lab, grades of “0” will be averaged in to determine your course grade. If you miss the final exam labs and do not make them up, a grade of zero will be used to determine your final exam grade. You are responsible for learning the required material and performing the required experiments.

Please note that an Absence Memorandum from the Office of Undergraduate Studies only verifies your documentation for missing a class. It does not entitle you to make up or be excused from any work, assignment, quiz, or test.

**OAKS based learning:** During each lab for this course you should utilize the OAKS lab website before lab to access communication tools for contacting your lab instructor; information about the lab experiments; spectral data and forms. You can access OAKS through the College of Charleston MyCharleston website. Go to https://my.cofc.edu/cp/home/displaylogin, login into MyCharleston using your system login ID and password. Once you are in the “MyCharleston” system, click on OAKS icon at the top of the page, and you will be taken to the OAKS site. The course material will be under the Student tab for myCourses.

**Lab Procedures and Notebooks:** Before coming to the lab, read the experiment planned for the week and determine what form and type of data you will be recording, so that you can set up appropriate data tables in your lab notebook. Some weeks we will have very detailed data collection requirements, so you want to plan on how best to record your data. This semester you will be working individually in lab without a partner for most labs, but you are free to discuss the labs inside and outside of class with anyone in the course, but remember to acknowledge help in your final lab report.

All of your data must be recorded in your lab manual. This notebook must contain the following:

- References to the experimental procedure/s used
- All data collected during lab—in a clear format—preferably a table
- Sign and date each page of the lab reports (this verifies that work contained in the report is your own).

During lab, you are to perform the experiments, record your data in the data tables and perform all necessary calculations. Before you leave the lab, you must get my initials on your data in your lab notebook at the end of each lab period to check off on results, housekeeping and safety.

**Lab Reports:** All lab reports are to be submitted at the start of lab the week after performing the experiments. When turning in your report, staple all the pages together and make sure your full name and lab section are written on the first page.

**Late Labs:** If for some reason you are unable to finish your calculations and results by the deadline, you may turn it in the next day by 2:30 pm with a 1 letter grade penalty. The lab report initial score will drop by a letter grade for every day it is late.

**Quizzes:** During the semester quizzes will often be given at the start of lab during the lecture. The quizzes will be based on material from the lab completed the previous week as well as material from the lab to be done that day.

**Final Exam:** The final exam will be an in class practical exam utilizing everything you have learned over the two year sequence you are completing, including organic and general chemistry.
The exam will be held during the last two or three weeks of the semester during regular lab. Failure to take the Final Exam will result in a grade of “X” which turns into an “F” after 48 hours.

**Lab Hygiene and Safety:** Every week, 1 or more student will be responsible for ensuring that at the end of lab all equipment, all common areas of the lab, and all lab benches have been cleaned. Your assignments for the lab clean up job will be assigned at the start of the semester.

**Grading:** The course grade will be comprised of the following critically evaluated elements of each student's performance: Products, Reports, and Quizzes (70%); Student Deportment and Notebook (10%), Laboratory Final (20%).

**Grade Scale:**
The grade scale for this course will be as follows: 100-93 (A); 92-89 (A-); 88-87 (B+); 86-82 (B); 81-79 (B-); 78-77 (C+); 76-72 (C); 71-69 (C-); 68-67 (D+); 66-64 (D); 63-60 (D-); 59-0 (F)

**Final Grades:** FERPA (The Family Educational Rights and Privacy Act) prevents me from posting grades and from emailing you or telling you your grade over the phone. You may consult MyCharleston to obtain your final grade.

**Snap Students:** Any student eligible for and in need of academic adjustments or accommodations because of a disability is requested to speak with the professor during the first two weeks of classes.

**International Students:** Federal regulations mandate that all international students report to the International Office for a "document check" within 10 days of the beginning of the semester. Failure to comply with this mandate will result in automatic termination of a student's visa. Please contact the College's Office of International Education and Programs if you have any questions.

**Electronics Device Policy:** Devices whose usage is prohibited in class at any time are: pagers, cell phones, radios, TV, CD, DVD, and MP3 players and similar devices. Devices that are allowed to be used at certain times during class, except during tests, exams and quizzes are laptops, handheld computers, PDAs, electronic pens, calculators, and similar devices. The sound must be off unless otherwise specified by the instructor. During tests, exams, and quizzes no electronic devices are allowed to be on or in sight, unless otherwise specified by the instructor.

**Email:** Email is considered an official method for communication at the College of Charleston. Official College of Charleston email accounts are automatically assigned to all students upon acceptance at the College. If a student wishes to have email redirected from their official college issued account to another email address, they may do so, but at their own risk. Having email redirected does not absolve the student from the responsibilities associated with official communication sent to his or her College account. Students are expected to check their College of Charleston official email on a frequent and consistent basis in order to remain informed of College related communications. Checking email on a daily basis is recommended.
### Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/11</td>
<td>Introduction to Honors Chemistry Laboratory – Safety procedures and course objectives, lab report expectations</td>
</tr>
<tr>
<td></td>
<td>1/18</td>
<td>No lab MLK holiday, 1/13 last day to drop/add</td>
</tr>
<tr>
<td>2</td>
<td>1/25</td>
<td>Lab 1 Colligative properties, monitoring freezing point depression</td>
</tr>
<tr>
<td>3</td>
<td>2/1</td>
<td>Lab 2 molecular modelling of energetics for Michael additions</td>
</tr>
<tr>
<td>4</td>
<td>2/8</td>
<td>Lab 3 Polymer chemistry</td>
</tr>
<tr>
<td>5</td>
<td>2/15</td>
<td>Lab 4 Chemical equilibrium procedures – common ion, temperature, competitive</td>
</tr>
<tr>
<td>6</td>
<td>2/22</td>
<td>Lab 5 sodium carbonate titration</td>
</tr>
<tr>
<td>7</td>
<td>2/29</td>
<td>Lab 6 polyprotic amino acid titration Line slope determination</td>
</tr>
<tr>
<td></td>
<td>3/7</td>
<td>Spring Break</td>
</tr>
<tr>
<td>8</td>
<td>3/14</td>
<td>Lab 7 solid state chemistry and gold nanoparticles</td>
</tr>
<tr>
<td>9</td>
<td>3/21</td>
<td>Lab 8 redox chemistry</td>
</tr>
<tr>
<td>10</td>
<td>3/28</td>
<td>Lab 9 Reaction kinetics of chromic acid oxidation of 1° and 2° alcohols monitored by UV/VIS (last day to drop with a W 3/18)</td>
</tr>
<tr>
<td>11</td>
<td>4/4</td>
<td>Lab 10 Reaction kinetics of the Aldol condensation monitored using picospin NMR</td>
</tr>
<tr>
<td>12</td>
<td>4/11</td>
<td>Lab final</td>
</tr>
<tr>
<td>13</td>
<td>4/18</td>
<td>Lab final</td>
</tr>
<tr>
<td>14</td>
<td>4/21</td>
<td>Lab final, Check-out, lab cleanup, review for lecture final</td>
</tr>
</tbody>
</table>