CHEM 112
PRINCIPLES OF CHEMISTRY

Lecture
Spring 2020

COURSE DESCRIPTION

An introductory course in chemistry emphasizing theoretical aspects and designed primarily for students who intend to take one or more additional courses in chemistry. The major topics covered are elementary classical thermodynamics (entropy and free energy), homogeneous and heterogeneous equilibria, properties of gases, liquids, and solids, theories of solutions and solubility, electrochemistry, acid-base theory and applications, and chemical kinetics.

Prerequisites: CHEM 111/111L; MATH 111 or equivalent,
Co-requisite: CHEM 112L

TEXTBOOK: Chemistry: Atoms First, 3rd Edition, by Burdge and Overby

COURSE OUTLINE

Ch 12 Liquids and Solids
Ch 13 Physical Properties of Solutions; Colligative
Ch 14 Properties Entropy and Free Energy
Ch 15 Chemical Equilibrium
Ch 16 Acids, Bases and Salts
Ch 17 Acid-Base and Solubility Equilibria, Buffers
Ch 18 Electrochemistry
Ch 19 Chemical Kinetics and Catalysis
Ch 20 Nuclear Chemistry

GENERAL INFORMATION

Meeting Times:
Lecture: Tuesday and Thursday, 12:15- 1:30, JEWISH STUDIES CENTER 233

Instructor:
Dr. Richard Salinaro
Office: SSMB 326
Phone: 843-953-5587 (This is the Chemistry Department Office #, they will forward messages to Dr. Salinaro)
E-mail: salinaror@cofc.edu

Office Hours:
Dr. Salinaro will hold office hours on Tuesday and Thursday 1:40- 3PM.
Also by appointment. Any verbal agreement on a meeting time needs to be verified by sending me a follow up email.

Messages:
Students may address questions and requests for appointments by contacting Dr. Salinaro via email (salinaror@cofc.edu). Emails will be responded to on or before the next business day.
**Supplemental Instruction:**
Supplemental instruction will be provided by: Charles Taibi (taibicp@g.cofc.edu. More information on the supplemental instruction program is available at http://csl.cofc.edu/supplemental-instruction.

**Course Webpages:**

**OAKS:** Important information regarding this course will be available on the OAKS webpage. This information includes all announcements and postings, lecture schedule and suggested reading assignments, select lecture notes, exam answer keys, handouts.

**ALEKS Assignment:** We will be using ALEKS (https://www.aleks.com/), an online tutoring and assessment system. Most of you will have had 111 at CofC and should be familiar with ALEKS. Students that purchased a year access last semester will be able to get right in and get working. Students that purchased one semester access will have to purchase another access code either from the bookstore or online directly in ALEKS. This access does give you the ebook as well. The class code to use when you log in is 3TUUT-RD96K

**Attendance Policy and Classroom Conduct:**

Students are expected to attend all classes, attendance will be taken randomly. Students are responsible for all information presented in class whether they are present or not. Students should obtain notes from a classmate and read the associated material in the text BEFORE they request help from the instructor about material missed.

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 or test

In order to foster a cordial and secure learning environment, please be respectful of your instructor and your classmates:

- Arrive on time
- **No cell phone use in class**, Set cell phones on mute or vibrate before coming to lecture.
  - Do not obstruct or disrupt the teaching and learning processes by carrying on conversations on your cell phone or with other students in the class, sending text messages, or surfing the web on your laptop.
  - Do not verbally abuse, threaten, intimidate, or ridicule your instructor or classmates.
- No eating in class.

If you fail to comply with these simple requests you will be asked to leave the class and if the problems persist you will be referred to the Dean of Students for disciplinary action.
Exams:
Four exams will be given. The tentative exam schedule is in this document. Absences from any exam must be arranged in advance. No make-up exams will be given. Students should contact Dr. Salinaro as soon as possible regarding scheduling conflicts. Answer keys will be posted on the course webpage or sent via email. The lowest test grade will be dropped.

Quizzes:
In-class quizzes will be administered once a week throughout the semester. You will be given ample notice that a quiz is being given. Quizzes will usually be two to four questions. No make-up quizzes will be given. The two lowest quiz grade will be dropped.

Final Exam:
A 110 minute comprehensive and standardized ACS final exam is scheduled for Saturday April 25 at 4PM. The multiple-choice final exam is cumulative over the material covered during the entire semester.
Requests for an alternate final exam time must be processed through the Office of Undergraduate Studies no later than 5 p.m. on the last day of class. Failure to take the final exam will result in a grade of "X" which turns to an "F" after 48 hours. Undergraduate students should be aware that excuses for missing final examinations may be obtained from the Office of Undergraduate Studies.
The acceptable reasons for missing final examinations are illness of the student (the student must provide documentation, e.g., an absence memo) or circumstances beyond the student's control. These reasons must be properly documented. See the section entitled "Final Examinations" in the Undergraduate Catalog for more information. Examinations must be taken at the time scheduled except when [a] two or more exams are scheduled simultaneously, or [b] the student has three examinations within a 24-hour period.

Electronic Device Policy:
No electronic devices except for calculators are allowed during exams. The use of any wireless communication devices, iPhones, iWatches, etc., during a test or the final exam is prohibited and will be considered to be a violation of the Honor Code.

“Make-up” Policy and Regrades:
As mentioned above, there are no make-up-tests for missed exams under any circumstances. If you have an emergency that is documented with a note from the Dean of Undergraduate Studies or a note from a medical doctor, you may be excused from an exam. Contact me as soon as possible.
Students may return exams they believe to have significant grading errors for reconsideration within one week of receipt of the graded exam. A significant error will constitute a >3 pt mistake on grading of an individual question. Students must submit clear and succinct explanations of the grading error(s) in question along with the exam
to be regarded. The explanation should establish that the answer key is incorrect or incomplete, that the answer given by the student is an equivalent or equally valid solution to that given on the key, or that the student gave the same answer as the key but it was not recognized as such. **No markings or other alterations should be made on the exam itself.** To ensure fair and equal treatment to all students, all changes in exam scores will be made only through this formal re-grade process. Dr. Salinaro will not discuss exam-score changes nor make exam-score changes in face-to-face meetings with students.

**HONOR CODE**

Student conduct is expected to conform to the standards of the College of Charleston Student Honor Code Policy. In addition, students in this course are also expected to be aware and to conform to the standards of the Department of Chemistry & Biochemistry Policy on Scientific Integrity.

Students at the College of Charleston are bound by honor and by their enrollment at the College to abide by the Honor and Conduct codes and to report violations. Faculty and staff members are equally required to report violations of the Honor Code or Code of Conduct. Students violating the Honor Code will be remanded to the college’s Honor Board.

**STUDENT DISABILITY/ACCESS STATEMENT**

This College abides by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act and will make reasonable accommodations for persons with documented disabilities. Students should apply for services at the Center for Disability Services/SNAP located on the first floor of the Lightsey Center, Suite 104, (843) 953-1431. If you have a documented disability that may have some impact on your work in this class and for which you may require accommodations, you are responsible for notifying me as soon as possible and for contacting me one week before accommodation is needed.
### IMPORTANT DATES

<table>
<thead>
<tr>
<th>DATE</th>
<th>DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td>Wednesday January 15</td>
<td>Last Day to Drop/Add Courses</td>
</tr>
<tr>
<td>Thursday January 30</td>
<td>Exam #1</td>
</tr>
<tr>
<td>Thursday February 20</td>
<td>Exam #2</td>
</tr>
<tr>
<td>Saturday March 7</td>
<td>Midterm Grades Available</td>
</tr>
<tr>
<td>Thursday March 12</td>
<td>Exam 3</td>
</tr>
<tr>
<td>Friday March 13</td>
<td>Last Day to Withdraw with a Grade of “W”</td>
</tr>
<tr>
<td><strong>Sunday March 15- Saturday March 21</strong></td>
<td>Spring Break</td>
</tr>
<tr>
<td>Thursday April 16</td>
<td>Exam #4</td>
</tr>
<tr>
<td>Tuesday April 21</td>
<td>Last Day of Lecture</td>
</tr>
<tr>
<td>Saturday April 25</td>
<td>Final Exam (4PM, JSC 233) Final</td>
</tr>
<tr>
<td>Monday May 4</td>
<td>Grades Available Online</td>
</tr>
</tbody>
</table>

### LEARNING OBJECTIVES

General chemistry provides you with an opportunity to do lots and lots of quantitative (numerical) and qualitative (conceptual) reasoning. General chemistry provides an introduction to the same material that is covered in the upper level physical chemistry courses, i.e., CHEM 341 and CHEM 342. This course also provides an important foundation for CHEM 231 and CHEM232. At the end of CHEM 112 you should be able to use the tools of basic mathematics and physics to solve problems in chemistry. *If someone poses a question about the physical basis of some chemical phenomenon, you should be able to apply your knowledge to suggest the appropriate theory or model to apply, be able to do the calculations necessary to apply the model and explain what you have done clearly and coherently so the person who asked the question has confidence that you know what it is you are doing.*

### GENERAL EDUCATION LEARNING OUTCOMES

- Students apply physical/natural principles to analyze and solve problems.
- Students will develop an understanding of the impact that science has on society.

The General Education Learning Outcomes will be assessed in the Lab Co-requisite course, Chem 112L
Specific Learning Outcomes

- Describe colligative properties and give specific examples.
- Explain the concept of equilibrium and apply it to chemical reactions including acid/base chemistry, precipitation reactions, and oxidation-reduction reactions.
- Define entropy and Gibbs energy. Apply these with respect to chemical reactions and evaluate how these affect the spontaneity of a chemical or physical process.
- Apply a kinetic analysis to chemical and physical processes (including rates, mechanisms, and activation energy).
- Apply the principles of thermodynamics and equilibrium to electrochemistry

**SEMESTER GRADES**

Semester grades will be calculated by weighted average using the following criteria:

<table>
<thead>
<tr>
<th></th>
<th>Grade Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALEKS Assignment</td>
<td>15%</td>
<td>Completing your objectives and completing your pie will each count as half of your ALEKS grade</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15%</td>
<td>See page 3 for a description.</td>
</tr>
<tr>
<td>Exams</td>
<td>50%</td>
<td>Four in-class exams are scheduled during the semester. Any exam date changes will be announced in class.</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
<td>A comprehensive ACS final exam is scheduled for 4PM Saturday, April 25</td>
</tr>
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</table>
Your final average is a weighted average score based on the percentages shown in the above table. Letter grades will be assigned based on the grading scale shown in the table below.

<table>
<thead>
<tr>
<th>Score/%</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>93-100</td>
<td>A</td>
</tr>
<tr>
<td>90-92</td>
<td>A-</td>
</tr>
<tr>
<td>87-89</td>
<td>B+</td>
</tr>
<tr>
<td>83-86</td>
<td>B</td>
</tr>
<tr>
<td>80-82</td>
<td>B-</td>
</tr>
<tr>
<td>77-79</td>
<td>C+</td>
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<tr>
<td>73-76</td>
<td>C</td>
</tr>
<tr>
<td>70-72</td>
<td>C-</td>
</tr>
<tr>
<td>67-69</td>
<td>D+</td>
</tr>
<tr>
<td>64-66</td>
<td>D</td>
</tr>
<tr>
<td>61-63</td>
<td>D-</td>
</tr>
<tr>
<td>&lt; 61</td>
<td>F</td>
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</table>

The instructor reserves the right to increase a student's grade if the instructor feels that it is warranted. It is suggested you keep a record of your performance on tests and quizzes to stay current with your standing in class.