Brooklyn College Department of Chemistry

GENERAL CHEMISTRY IA, CHEM 1050 –SPRING 2020

Required Texts: • *Chemistry 2e*, P. Flowers, OpenStax, 2019

This text is available as a free PDF at https://openstax.org/details/books/chemistry

It is also available free for Kindle at http://www.amazon.com

You can order a hard copy through https://brooklyn.textbookx.com/adm/ or from http://www.amazon.com – but you can always print chapters from the PDF.

Learning Objectives for Chemistry 1050

Upon completion of this course, students should:

- Understand the basic physical principles underlying chemistry and be able to apply them both to qualitatively explaining phenomena and quantitatively predicting or interpreting outcomes.
- Understand and be able to explain fundamental ideas in the practice of science, including the nature of scientific evidence, the scientific method, and appropriate practices with respect to record-keeping, safety, and treatment of data.
- Students should be able to apply principles of chemistry to understanding its role in other fields (e.g. biology), while understanding its underpinnings in physics and mathematics.

Required Items:

- Scientific calculator (**Graphing calculators and internet devices are not allowed on exams)**
- Recommended: Texas Instruments calculator TI-30X (or similar scientific calculator)

Online Supplements and Information:

http://www.brooklyn.cuny.edu/web/academics/schools/naturalsciences/undergraduate/chemistry.php (Chemistry Department Homepage)

http://www.brooklyn.cuny.edu/web/academics/centers/learning.php Brooklyn College Learning Center (free tutoring available)

Counseling	*Coordinator for General Chemistry*	Prof. Joann Mathias, 359NE jmathias@brooklyn.cuny.edu
	Undergraduate Chemistry Advisor:	Prof. Aneta Mieszawska Aneta.Mieszawska@brooklyn.cuny.edu
	Health Profession Counseling:	Prof. Silbering 2231B silbering@brooklyn.cuny.edu

Lecture Tests:

FIRST Test: Exam dates are set by individual instructors

SECOND TEST:

FINAL EXAM:

No makeup exams given for missed lecture tests.

Students arriving late to an exam will not be admitted after 30 minutes.

Also, students will not be allowed to leave the exam any earlier than 30 minutes after the exam has begun.

Academic dishonesty is prohibited in the City University of New York.

Cheating, plagiarism, internet plagiarism and obtaining unfair advantages are violations of policies of academic integrity and are punishable by penalties, failing grades, suspension and expulsion.
For more information about CUNY policy on academic integrity see
http://www.brooklyn.cuny.edu/bc/policies/pdt7CUNY%20PolicyAcademicIntegrity.pdf

Student Disability Services

In order to receive disability-related academic accommodations students must first be registered with the Center for Student Disability Services. Students who have a documented disability or suspect they may have a disability are invited to set up an appointment with the Director of the Center for Student Disability Services, Ms. Valerie Stewart-Lovell at 718-951-5538. If you have already registered with the Center for Student Disability Services please provide your professor with the course accommodation form and discuss your specific accommodation with him/her.

Student Bereavement Policy

Students who experience the death of a loved one during the semester should consult the student bereavement policy here:
http://www.brooklyn.cuny.edu/web/about/initiatives/policies/bereavement.php

Non-Attendance Due to Religious Beliefs

Students who are unable to attend class due to religious observations should consult the Brooklyn College Undergraduate Bulletin for the college's policy, and contact the lecturer to discuss the issue. Students must come forward with the issue in a timely manner.

Your final grade will be determined as follows:

40% Two lecture tests
30% Quizzes: Minimum of 4 quizzes. Dates to be determined by the lecturer
30% Final Exam

Final grades are not curved, but are set according to the following scale:

95 or higher: A+	68-70: C+
87-95: A	62-68: C
85-87: A-	58-62: C-
82-85: B+	58-50: D*
82-72: B	Less than 50: F
72-70: B-	

*__Note:__ If you earn a grade of D, that is the grade you will receive.

Drop/Add Dates:

February 2	Last day to add a course
February 17	Course withdrawal period begins. A grade of "W" is assigned to students who officially withdraw from a course
April 1	Last Day to withdraw from a course with a grade of "W"

Pass-Fail Option: Details regarding taking courses on a pass/fail basis are given in the Brooklyn College bulletin. Students interested in this option should read the bulletin carefully, as they may not be eligible to do so; questions should be directed to the Registrar. However, note that the last day to submit a request to take a course on a pass/fail basis is given in the calendar above.

Instructor contact information and office hours:

Chem 1050 Assigned Reading

Below is the assigned reading and a corresponding set of homework problems. Your lecturer will give you guidance about where you are in the text and what to do to stay current with the reading. **Read the material at least once before the lecture**, and spend some time on the in-chapter problems to reinforce it. Unless noted otherwise, problems listed as Homework correspond to the end-of-chapter problems for the corresponding chapter. Answers to red problems are at the end of the Chapter. **If you are instructed to memorize something, the test will be written assuming you have done so.**
Homework is assigned but not graded. Quiz and examination questions will mostly be similar to those given in the text. You should do as many of these as possible.

Topics	Assigned Reading and Problems
Math Review, Dimensional Analysis Basic concepts	**Chapter 1**: Problems 17, 18, 23, 25, 27, 29, 30, 32, 37, 38(a,d,e,f), 40, 45, 47, 49, 51, 53, 71, 77(e), 85, 87, 89, 97 + Supplementary Problems (Factor Label Method & Unit Conversion) **Memorize:** You must know the name and symbols of the first 36 elements of the periodic table, plus the following elements: Ag, Au, Pt, Hg, Sn, and I. You do <u>not</u> have to know their atomic numbers from memory (you will always have a periodic table), but you need to be able to write the symbol if given the name, and vice versa. **Memorize:** You must know the metric prefixes from nano- to Giga-, as given in Table 1.3. You need to know the prefix (nano-), the 1-letter abbreviation ("n"), and the power of 10 (10^{-9}). **Memorize:** You need to know the relationships between metric units, and be able to convert between them (e.g. kg to g, or ^{o}C to K). You do not need to know English units or their conversions to metric, with the sole exception of temperature. You must be able to convert from ^{o}F to ^{o}C, and vice versa.
Elements, Compounds, Ions Periodic Table	**Chapter 2**, sections 2.1-2.6: Problems 1, 4, 8(a,b), 9(a,b), 10, 11, 17, 19, 23, 25, 27, 29, 31, 40, 41, 49. **Chapter 2**, section 2.7: 51, 53, 55, 57, 58, 59, 60 **Memorize***: **You will be given a table of ions. You should know the name, formula, and charge of each.***
Moles Empirical Formulas, Molarity	**Chapter 3,** sections 3.1-3.2: 3, 5, 13, 16, 17, 20, 21, 25, 27, 29, 30, 33, 35, 37, 39 **Chapter 3**, section 3.3: 47, 49, 51, 53, 57, 59, 63, 65
Chemical Equations, Stoichiometry, Limiting Reagents, Analytical	**Chapter 4,** sections 4.1 & 4.3-4.4: 3, 5, 42, 43, 44, 45, 47, 52, 55, 57, 61, 63, 65 **Chapter 4**, sections 4.2 & 4.5: 9, 11, 13, 14, 17, 19, 21,23, 25, 28, 29, 30, 33, 78, 79, 81, 83, 87, 89,91, 95 ***A table of the Activity Series of Metals in Aqueous Solution will be given to you. This will be covered in lecture and you will be tested on this material.***
Thermochemistry	**Chapter 5**: Problems 3, 4(a), 5, 7, 8, 9, 11, 13, 14, 19, 21, 23, 25, 28, 29, 31, 33, 35, 45, 47, 49, 50, 55, 58, 59, 63, 69, 71, 73, 79, 83, 84, 85

Chemistry Careers In and Out of the Laboratory

A degree in chemistry opens doors to dozens of exciting and rewarding careers. Here are just a few possibilities.

- Get involved in product development, manufacturing, or quality control for companies producing anything from chemicals to pharmaceuticals to textiles.
- Go on to obtain a MS or PhD in chemistry, biochemistry, biotechnology, bioinformatics, pharmacology, or any other biomedical field, and take a leading role in medical research. Design and test new drugs and medical devices.
- Get involved in sales and marketing for chemical and pharmaceutical firms. Companies are always looking for people with a strong technical background to market their products, and will pay top dollar for them.
- Go into the field as an environmental chemist to study and protect the natural world.
- Use your skills in interesting and challenging ways, from evaluating risk for insurance firms to restoring artwork for museums.
- Work in law enforcement, in anything from forensic investigation to health and safety regulation. Or work inside the political process at a government agency to help formulate policy on scientific, medical and environmental issues.
- Pursue a career in patent law and help bring the next great scientific breakthrough to the market. Or work in the U.S. Patent and Trademark Office to insure that inventors' rights are protected.

Salary Information

Chemistry Degree	Median Starting Salary*	Median Base Salary (all chemists)**
BA or BS	$39,600	$77,000
MS	$55,000	$87,000
PhD	$75,700	$105,000

*From *Chemical and Engineering News*, June 2, 2014, p.28.
**From *Chemical and Engineering News*, November 9, 2015, p. 30.

Chemists do sometimes have to change jobs or make career choices, but their skills are always in demand. In 2009, the U.S. unemployment rate peaked at 10.1%; the rate for chemists and chemical engineers that year was 3.9%. (see S. L. Rovner, *Chemical*

and Engineering News, Nov. 7, p. 34, 2011). A skilled chemist is a valuable commodity.

Salaries for chemists are high, but do not do justice to the excitement of the field. Science as it is practiced today is collaborative, and chemists have abundant opportunities to travel, to work with interesting people, and to present the results of their work in ways that have a profound influence on the world. Science will shape the world of the 21st century, and you have the chance to be part of that process.

Medical School, the Chemistry Major, and You

Fiction #1: Being a chemistry major will hurt my chances for medical school, because the hard courses may lead to a lower GPA.

Fact: Students majoring in mathematics and the physical sciences (this includes Chemistry) have the highest medical school acceptance rate of any major:

Primary Undergraduate Major	Acceptance Rate
Mathematics and Physical Sciences (including Chemistry)	46%
Biology and Health Sciences	40%
Humanities and Social Sciences	43%
Other	40%

Based on data for the entering class of 2018, reported by the American Association of Medical Colleges
Table compiled from data available at https://www.aamc.org/

Fiction #2: Chemists have to take a lot of hard courses so they don't have time to do volunteer work, research, and other activities that help with medical school applications.

Fact: A student who has completed his or her requirements for medical school can obtain a chemistry degree with as few as five additional courses. This leaves plenty of time for other activities.

Fiction #3: If I don't get into medical school, I may be stuck working in a lab all day.

Fact: Chemists have enormous opportunities outside the lab. Chemical and pharmaceutical companies desperately need managers and salespeople with chemical knowledge, and will pay top dollar for them. Chemists also find work in finance, insurance, law, government and manufacturing. Go to the American Chemical Society website on Careers (https://www.acs.org/content/acs/en/careers.html) and use the "College to Career" link.

Some other advantages of being a chemistry major:

- Chemistry majors can receive credit for performing research work with a faculty mentor. This means the time you spend on research gets you closer to graduating and your research experience appears on your transcript.
- Chemistry majors get the skills they need to perform advanced laboratory work, so they can get better research positions, accomplish more and get stronger letters of recommendation from their mentors.