**GENERAL CHEMISTRY II, CHEM 2200, LECTURE** - **SPRING 2022 DAYTIME**

# LECTURE INSTRUCTOR CONTACT INFORMATION, CLASS AND OFFICE HOURS

**Paul Cohen**

[**Kinggama45@aol.com**](mailto:Kinggama45@aol.com) ***A Brooklyn.cuny.edu email address will be provided soon.***

**Class Meetings: 11:00 to 12:15 room: 1310 Ingersoll Hall**

**Office Hours: Tuesday, 12:30 to 1:30. LIVE, 357 N**

**Tuesdays, 7 PM** to **8 PM** **ZOOM**  **Will also ZOOM on request for students who are unable to attend a lecture due to illness.**

**LECTURE SUPPORTING MATERIALS are available on** **my website, pinchaschemsite.com**

They will be listed under the page heading “Brooklyn2022”

*See page 2 for* ***recitation*** *information*

**REQUIRED TEXTS**:

* ***Chemistry 2e*, P. Flowers, OpenStax, 2019**

*This text is available as a* ***free PDF*** *at* [***https://openstax.org/details/books/chemistry***](https://openstax.org/details/books/chemistry)

***https://assets.openstax.org/oscms-prodcms/media/documents/Chemistry2e-OP\_TkF9Jl3.pdf***

*It is also available free for Kindle at* [*http://www.amazon.com*](http://www.amazon.com/)

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

**PRE-/CO-REQUISITE REQUIREMENT:** You must be registered for Chem 2201 laboratory if you have not already completed it. You will not be permitted to take additional Chemistry courses if you do not complete the laboratory. ALSO: You must complete Chem 2110 before you can register for Chem 3511/12 Organic Chemistry I. You should register for Chem 2110 simultaneously with Chem 2200 if you intend to do go on.

**REQUIRED ITEMS**

* Scientific calculator I recommend TI 30 XA or Casio fx260 solar. The latter is very convenient, as it is pocket sized and has everything you need. The TI XA is actually a bit easier to use for gen. chem. But any scientific calculator you are comfortable with is fine. You should bring it to every lecture and recitation!

# RECITATION SECTION

This course includes a required recitation section that you will need to attend. Quizzes in your recitation section are part of your course grade. You will receive a separate syllabus for your recitation, but attendance in recitation is **mandatory**.

# LEARNING OBJECTIVES FOR CHEMISTRY 2200

*Learning Objectives for each Chapter are posted on Blackboard* 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 and the scientific method.
* 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.

**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) http://userhome.brooklyn.cuny.edu/mkobrak/labvideos.html (Lab instruction videos)

**COUNSELING** *Health Profession Counseling* **Dr. Steven Silbering**

silbering@brooklyn.cuny.edu

*Undergraduate Advisor* **Prof. Laura Juszczak**

ljuzak@brooklyn.cuny.edu

**Lecture Exams:**

First Exam: **Tuesday, March 15, 11 to 12:15 Ch. 12, 13, 14.**

Second Exam: **Tuesday, April** **2**6, **11 to 12: 15 Ch 15,16,17,19**

**FINAL EXAM Tuesday, May 24, 10:30 to 12:30 Cumulative. (ALL Chapters)**

**GRADING:**

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| --- | --- |
| Your final grade will be a weighted average calculated as follows:  **40% Two lecture exams**  **25% Recitation quizzes**  **35% Final Exam** | Final grades are not curved, but are set according to the following scale:  95 or higher: **A+** 65-68 C+  82-94.9: **A** 58-65: **C**  80-82 : **A-** 55-58: **C-**  78-80 : **B+** 50-55: **D**  72-78 : **B** Less than 50: **F**  68 – 71 : **B-**    **\*Note:** If you earn a grade of D, that is the grade you will receive. Requests to change it to an F will not be honored. |

# Chemistry 2200 RECITATIONS

**Your RECITATION INSTRUCTOR will provide all details regarding your RECITATION class.**

**Recitation Instructors:** *contact your recitation instructor if you have any questions re your recitation class*

TEAR-Rec Tuesday 10: AM to 10:50, Solmaz Azizi . [Solmaz.Azizi@Brooklyn.cuny.edu](mailto:Solmaz.Azizi@Brooklyn.cuny.edu)

TEBR-Rec Monday 8 AM to 8:50 Abdelahad Khajo [Khajo@Brooklyn.cuny.edu](mailto:Khajo@Brooklyn.cuny.edu)

TECR-Rec Wednesday 5:30 PM to 6:20 Joe Wu [Joe.Wu@Brooklyn.cuny.ed](mailto:Joe.Wu@Brooklyn.cuny.ed)

TEDR-Rec Friday 8 AM to 8:50 Azaria Eisenbeg. [AEisenberg@Brooklyn.cuny.edu](mailto:AEisenberg@Brooklyn.cuny.edu)

**COVID-related absences:**

If you believe you have COVID, you must file a Case Collection form here: <http://www.brooklyn.cuny.edu/web/about/initiatives/initiatives/return/resources/case-collection-form.php>If this leads you to miss a quiz, examination, or other required work, you must contact your instructor immediately. An accommodation will be made, but only if you are proactive in seeking assistance from your instructor.

**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://web.cuny.edu/academics/info-central/policies/academic-integrity.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.

**IMPORTANT DATES, DROP/ADD DATES:**

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| **February 3** | Last day to add a course |
| **February 3** | Last day to drop for 75% tuition refund |
| **February 8** | Conversion Day. FRIDAY schedule. |
| **February 10** | Last Day to submit a pass/fail elective application online for Spring 2022 |
| **February 17** | Last day to drop for 25% tuition refund |
| **February 18** | Grade of W is assigned to students who officially withdraw from a course |

**February 21 Mon** **College Closed** - No classes scheduled

**April 15-22** **Spring Recess** - No classes scheduled

**May 17** Last day to withdraw from a course with a grade of W\* **May 18-24** Final Examinations

**\*To withdraw, you must withdraw using CUNYFirst.**

**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. Also note that the deadline to declare an intention to take a course Pass-Fail varies from semester to semester, but generally falls within the first two weeks of the course (contact the Registrar for the specific date). After this deadline, it is impossible to take the course Pass-Fail.

**CHEM 2200 ASSIGNED READING AND HOMEWORK PROBLEMS**

***TEXTBOOK: Chemistry 2e*, P. Flowers, OpenStax, 2019** [*https://openstax.org/details/books/chemistry*](https://openstax.org/details/books/chemistry)**Below is the assigned reading and a corresponding set of homework problems. Read the material at least once before watching lecture video, 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 odd-numbered problems are at the end of the text. **If you are instructed to memorize something, the test’s questions will be written assuming you have done so.**

**Homework** is assigned but **not graded**. Examination questions will mostly be similar to those given in the text. You should do as many of these as possible before recitation section, and bring any questions you have on the work to your instructor. Remember: Your recitation time is your chance to get help with things you do not understand. If you have not done the homework, you will get little out of it.

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| **UNIT** | **Assigned Reading and Problems** |
| **Kinetics** | **Chapter 12**: Problems 1, 3, 4, 5, 6, 7, 12, 13, 15, 17, 19, 21, 23, 25, 26, 29, 31, 37, 44, 46,  47, 53, 68, 69, 70, 71, 73, 74, 76, 79, 81, 83, 84  **Note:** In Section 12.4, you are **not required** to be able to work problems using the 0th order or 2nd order integrated rate laws. You are also **not required** to determine the order of a reaction rate by graphing, as described in Example 12.7. However, you do need to be able to use the 1st order integrated rate law in ways similar to that shown in Example 12.6. You should also know what the half-life of a reaction is, and how it is related to the rate constant in a first-order reaction (see the subsection of 12.4 “The Half-Life of a Reaction.” |
| **Fundamental**  **Equilibrium**  **Concepts** | **Chapter 13**: Problems 1, 3, 5, 6, 7, 9, 11, 13, 15, 17, 19, 25, 29, 31, 33, 35, 37, 39, 40, 41, 45, 46, 49, 53, 55, 57, 59, 61, 65, 67, 69, 75, 77, 79, 81, 83, 89 |
| **Acid-Base Equilibria** | **Chapter 14**: Problems 1, 3, 5, 9, 11, 15, 17, 19, 21, 25, 27, 29, 31, 35, 47, 51, 53, 57, 58, 61, 69, 77, 79, 81, 86, 87, 89, 91, 94, 95  **Memorize**: Table 4.2, identities of some common strong acids (not a misprint, see the table in Chapter 4). |
| **Equilibria of**  **Other Reaction Classes** | **Chapter 15**, **Sections 15.1-15.2 (NO section 15.3)**: Problems 1, 3, 9, 11, 13, 15, 25, 29, 31, 33, 37, 49, 55, 61, 63, 65, 67, 69, 75, 77 |
| **Thermodynamics** | **Chapter 16**: Problems 1, 2, 3, 13, 15, 17, 19, 20, 21, 25, 27, 30, 31, 33, 35, 37, 39, 41, 45, 55, 61, 63, 65, 66 |
| **OxidationReduction Rxns**  **Electrochemistry** | **Chapter 4, Section 4.2**: Oxidation/Reduction Reactions (Balancing by half-reaction method): Problems 17, 37, 39, 41  **Chapter 17**, **Sections 17.1-17.4 ONLY**: Problems 3, 5, 6, 7, 19, 21, 23, 25, 29, 31, 33 |
| **Transition Metals and Coordination Chemistry** | **Chapter 19**: Problems 1, 2, 26, 27, 28, 29, 31, 33, 35, 37, 41, 45, 47  Supplement: Chirality in Inorganic Chemistry – Read section and do the exercise at the end of the packet (answers in packet). |
| **Advanced**  **Theories of**  **Covalent Bonding** | **Chapter 8, Sections 8.1-8.3 ONLY**: Problems 1, 3, 7, 9, 10, 11, 12, 14, 15, 17, 23, 27,  29, 30 |
| **Organic Chemistry** | **Chapter 20, Section 20.1, Functional Groups (Follow Lecture Notes)** : Problems 1, 5,  6, 7, 9(a-c, e), 11c, 12(c,d), 15, 17, 22(a,c), 43, 44  Supplement: Chirality in Organic Chemistry |
| **Biochemistry** | **Biochemistry** lecture notes |
| **Nuclear Chemistry** | **Chapter 21**: Problems 1, 3, 13, 15, 17, 21, 32, 33, 35, 41, 45, 49, 51, 53, 57 |

# CLASS SCHEDULE

***TEXTBOOK: Chemistry 2e*, P. Flowers, OpenStax, 2019** [*https://openstax.org/details/books/chemistry*](https://openstax.org/details/books/chemistry)**IMPORTANT: There might be some changes/modifications to this schedule – they will be announced.**

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| **UNIT** | **Date** |
| **Kinetics Chapter 12** | **February 1, 3** |
| **Fundamental Equilibrium Concepts Chapter 13** | **February 10, 15** |
| **Acid-Base Equilibria Chapter 14** | **February 17, 22, 24, March 1** |
| **Other Equilibria**  **Chapter 15** | **March 3, March 8.** |
| **Wrap-up, Review, 12 to 15** | **March 10** |
| **First Lecture Test** | **March 15** |
| **Thermodynamics Chapter 16** | **March 17, March 22** |
| **Oxidation-Reduction Rxns**  **Electrochemistry Chapter 4 (Sec 4.2) and Chapter 17** 17.1 to 17.4 only | **March 24, March 29, March 31** |
| **Transition Metals and Coordination**  **Chemistry**  **Chapter 19** | **April 5th April 7 th** |
| **Theories of Covalent Bonding**  **Chapter 8, 8.1 to 8.3 only** | **April 12** |
| **Review, Chap. 16,17, 19, parts of 4 and 8** | **April 14** (No classes Apr 18 – Spring Break) |
| **Second Lecture Test** | **April 26** |
| **Organic Chemistry Chapter 20 , Section 20.1 Functional groups, + lecture notes** | **April 26, April 28**. **May 3** |
| **Biochemistry** | **May 5** |
| **Nuclear Chemistry Chapter 21** | **May 10th and May 12th** |
| **Review** | **May 17th.** |
| **FINAL EXAM** | **May 24** |

# 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 ensure that inventors’ rights are protected.

**Salary Information**

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| --- | --- | --- |
| Chemistry Degree | Median Starting Salary\* | Median Base Salary (all chemists)\*\* |
| BA or BS | $42,000 | $89,220 |
| MS | $50,000 | $95,000 |
| PhD | $75,000 | $107,000 |

\*From S. Marchant and C. Marchant, *Starting Salaries of Chemists and Chemical Engineers: 2015*, American Chemical Society, Washington DC, 2016.

\*\* From *Chemical and Engineering News*, February 1, 2021, p. 20.

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)](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.
* Thanks to generous donations by alumni, the Department of Chemistry is able to give out more than $5,000 every year in fellowships, scholarships and awards. These are an aid to both the pocketbook and the resumé.