

**Brooklyn College Chemistry 1007**  
**Chemistry in the Context of Food, Cooking and Sustainability**  
**Spring 2018 Syllabus - L.J. Juszczak**  
**Sections M9-- and M3--**

**Course Goals and Learning Objectives.** The goal of this course is to give the student a basic understanding of chemistry and physical processes in the context of food chemistry, metabolism and cooking. The course also necessarily makes connections to the future sustainability of food and water. We aim to prepare the student for the increasingly urgent and complex national dialogue on the interrelated topics of global climate change, energy, pollution, extinction and the food supply. The specific objectives of this course are to provide the student with the basic vocabulary of chemistry, and a basic understanding of the experimental process as it relates to food chemistry and cooking.

### Course Materials

**No purchase of a textbook is required.** Reading assignments will be available either via Blackboard or online through an URL that is provided.

**Lab experiment** PDFs will be available on Blackboard OR you may purchase a lab experiment textbook:

*Experiments for Core Chemistry at Brooklyn College* (ISBN 978-1-5249-1367-0; dull green background on cover).

**You will need:** A small combination or key lock to secure lab supplies in the lab desk cabinet.

**NB: LAB ATTENDANCE IS NOT OPTIONAL.**

### The CURRICULUM

The order of the class topics is given below. However, the instructor reserves the right to make adjustments when necessary. Reading material corresponding to the headings listed below is available at the course website on Blackboard, as are excerpts from the specifically listed texts: *The Kitchen as Laboratory*, *The Disappearing Spoon*, *Culinary Reactions*, *The Secret of Scent*, *The Emperor of Scent* and others.

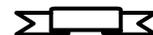
**Make sure that the email address you use is the one listed in BlackBoard** because I will be sending you class information via this email address. To change your email address in BlackBoard, follow these steps:

1. Go to [cunyportal.cuny.edu](http://cunyportal.cuny.edu) and log in.
2. Click on icon for BlackBoard.

3. Click on Brooklyn College tab at the top of the page.

4. In the upper left box, titled, 'Caliper.tools\_label,' click on 'update email.'

5. Change your email address to the one you regularly use.



### Basic Considerations

Lab safety-Mastering the material-how to study-critical thinking-memorization vs. mastery of material-finding your passion



**A planetary perspective on climate change**



### The Development of Chemistry as a Science

From Alchemy to Chemistry: A History of the Development of Chemistry

The Scientific Method



### Matter, the Periodic Table, Combustion

Necessary basics: classification of matter, the Periodic Table

Naming compounds; combustion

*The Disappearing Spoon: Geography is Destiny*



### Atomic Structure, Periodicity, Electromagnetic Radiation

Atomic structure, periodicity, molecules and models

Light and color; biological effects of UV radiation: mitigation by micronutrients

*The Secret of Scent*: atomic structure, valence, bond formation



### Properties of Water, Hydrogen Bonding, Molarity

The unique properties of water; hydrogen bonding

Aqueous solutions, solutes, ionic compounds, naming ionic compounds

Solubility of Ionic Compounds

Counting atoms and molecules: molarity

*Kitchen as Lab*: Chapter 4 Spherification: Faux Caviar and Skinless Ravioli (pdf)

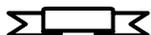
Covalent compounds and solutions, water purification, potable water; future water sources, influence on food availability

*Kitchen as Lab*: Chapter 12 Scandinavian "Sushi"



**MIDTERM: after completion of topics associated with water.**

**APPROXIMATE DATE: 8<sup>th</sup> week of classes, midterm is given during class hours. BRING PENCILS**



### Acids and Bases, pH, Neutralization

What is an acid? What is a base?

Neutralization, review of logs, introducing pH

Color in food

*Culinary Reactions*: Chapter 12, Acids and Bases



### Polymers

Natural polymers, addition polymerization  
Condensation polymerization; polyamides, functional groups

*Kitchen as Lab*: Chapter 5 Designing a Sustainable Stretchy Ice Cream



### Molecules of life

Proteins, the nitrogen cycle

Fats and oils

Trans vs. cis fats; interesterification

*Culinary Reactions*: Chapter 5, Oils and Fats

Carbohydrates and sugars

*Kitchen as Lab*: Chapter 13 Maximizing Food Flavor: the Maillard Reaction

*The Secret of Scent, The Emperor of Scent*: functional groups in scent; the musical chord of scent

Vitamins and Minerals

Metabolism: energy from food; diet (quality vs. quantity; Malnourishment

Sustainability, renewable and nonrenewable resources

Footprints: ecological, carbon, water, air - how our food choices impact these

Locavorism; flexitarian, vegetarian, vegan



### DNA: The Body's Blueprint

The structure of deoxyribonucleic acid

DNA: the code for proteins

Genetic Engineering vs. selective breeding



**FINAL EXAM will be given during class hours, the last day of classes, Wednesday, May 16 (BRING PENCILS).**

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### Instructor Contact Information

<u>NAME</u>	<u>Extension</u>	<u>Room</u>
Prof. Juszczak	1426	Ingersoll 3119
LJUZZAK@brooklyn.cuny.edu		
<b>Office hours:</b> 10:00 am - 12:00 pm Tuesday 3:00 -5:00 pm Thursday or by appointment (email first).		

The final grade for the course is based on the sum of the scores received for the following:

30% lab grade <sup>1</sup>

25% 6 quizzes (one grade dropped)

20% midterm exam

25% final exam grade

**PROBLEM SETS.** There are none.

**QUIZZES.** There are six in-class quizzes, given every second Wednesday, beginning with February 7. Subsequent quiz dates are: February 21, March 7 and 21, April 18, and May 2. The lowest quiz grade will be dropped so quiz grade will be based on the score for the 5 remaining quizzes.

**EXAMS.** Exams are scheduled during class time. Questions from the lab experiments may be included in both the midterm and final exam. **Calculators or use of other electronic devices are not necessary nor are they allowed during exams but you will need pencils.**

Bring pencils. The final exam will focus on material from the second half of the course but not exclude material from the first half. **Bring pencils!!!** Be sure to arrive on time. **Exams will not be available after the first student leaves OR after the first 20 minutes (whichever comes first).**

It is the student's responsibility to **note the midterm and final exam time, place and date** at the beginning of the semester, and to be sure **not to schedule other activities during this time.** There is no make-up mid-term exam. If the midterm exam is missed, the final exam will be count towards both the midterm and final exam grade points.

Course work cannot be completed independent of the lab work. **NO credit is earned for coursework without completion of the lab assignments.**

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<sup>1</sup> **Laboratory Schedule**

**NOTE:** Labs meet EVERY WEEK.

Lab meeting 1: Check-in, lab techniques. Intro to first Experiment, Physical and Chemical Changes of Matter

Lab meeting 2 & 3: Physical and Chemical Changes of Matter and Conservation of Mass

Lab meeting 4: A Change in Energy accompanies Physical and Chemical Changes

Lab meeting 5: Colorimetric ID of Ions

Lab meeting 6: Counting out Atoms and Molecules using the Concept of Moles

Lab meeting 7: Carbon Dioxide as a Reaction Product

Lab meeting 8: The Effect of Chemical Bonds on the Physical Properties of Matter

Lab meeting 9 & 10: How Water is Purified

Lab meeting 11: Paper Chromatography of Pigments in a Spinach Leaf

Lab meeting 12: Creating Aromas -Ester Synthesis

Lab meeting 13: Using Models to Build Molecules

Lab meeting 14: Check-out

**Details about lab attendance, lab reports and grades.** Attendance will be taken at the beginning of each lab class. It is the student's responsibility to notify the instructor of her/his presence.

Students are expected to come to lab **ON TIME** and be prepared by having read and understood the lab procedure **BEFORE** carrying out the work in class.

Each of the 10 lab report sheets must be handed in at the laboratory class meeting one week following the completion of the experiment. **Lab report sheets** are expected to be stapled together, and the student's and lab instructor's name must appear on each sheet. 10 points are awarded for each lab report. Point assignment is at the discretion of the lab instructor, but no less than 4 points shall be awarded for completion of the lab work.

Instructors deduct 3 points for each week the lab report is handed in late. Labs missed due to illness must be made up by attending alternate lab sessions with permission of the lab instructor,

arranged through the General Chemistry stockroom technicians, Dr. Yasemin Kopkalli or Dr. Olga Berezovska (248 IE). Documentation of illness must be presented to the stockroom technician. Labs so completed must be accompanied by a signed lab form, obtained from the stockroom technician. This form is to be returned to the student's assigned lab instructor. Experiments not completed will result in a grade of zero for that experiment. **LAB ATTENDANCE IS NOT OPTIONAL. STUDENTS WILL RECEIVE A GRADE OF F FOR THE COURSE IF MORE THAN TWO LABS ARE MISSED AND NOT MADE UP. MISSED LABS MUST BE MADE UP WITHIN 2 WEEKS OF THE EXPERIMENT ASSIGNMENT. LAB MAKE-UPS ARE SUBJECT TO LAB SPACE AVAILABILITY. LAB MAKE-UPS CANNOT BE SCHEDULED DURING THE LAST TWO WEEKS OF CLASSES.**

Students are to work individually in the laboratory unless specifically told otherwise. Students are expected to actively participate in the collection of all data. 'Sharing' of results without actual participation in collection of those results constitutes cheating; no credit will be given for that lab.

It is a **New York State law** that **safety goggles must be worn** at all times by all students in the laboratory. **Goggles are provided as part of the lab equipment rental fee.** Students who consistently refuse to properly wear safety goggles during the lab period **will be dismissed from the laboratory.** Students so dismissed will not have the opportunity to make up missed lab work. It is the student's responsibility to bring her/his goggles to each lab session. If the student completes their lab work before the end of the session, students **MUST** continue to wear their goggles until they have exited the lab.

Eating and drinking are also not permitted during lab sessions. Students may also be dismissed for violation of this safety rule.

**Pregnant students are encouraged to defer taking chemistry 1007 as the lab is an integral part of the course.**

#### **Accommodations for Students with Disabilities**

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.

**Academic Integrity.** The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both. The complete text of the CUNY Academic Integrity Policy and the Brooklyn College procedure for implementing that policy can be found at this site:

[http://www.cuny.edu/about/administration/offices/la/Academic\\_Integrity\\_Policy.pdf](http://www.cuny.edu/about/administration/offices/la/Academic_Integrity_Policy.pdf). If a faculty member suspects a violation of academic integrity and, upon investigation, confirms that violation, or if the student admits the violation, the faculty member **MUST** report the violation.

All students should read carefully and thoroughly the 2015-2016 Brooklyn College Bulletin ([http://www.brooklyn.cuny.edu/web/off\\_registrar/2017-2018\\_Undergraduate\\_Bulletin.pdf](http://www.brooklyn.cuny.edu/web/off_registrar/2017-2018_Undergraduate_Bulletin.pdf)) for a complete listing of academic regulations of the College.

**Classroom Etiquette.** Eating and cell phone usage is not allowed during lecture. Unnecessary and superfluous movement, talking and other disruptive behavior distracts other students' attention from the lecture material to which they are entitled. Students who create such disturbances will be asked to leave and/or escorted from the classroom.

The state law regarding non-attendance because of **religious beliefs** shall be followed as given in the Brooklyn College Bulletin, Undergraduate Programs 2017-2018, p. 66, link given above.