

Brooklyn College Chemistry 1007
Chemistry in the Context of Food, Cooking and Sustainability
Fall 2017 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 online through an URL that is provided.

However, a lab manual is required:

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

Also required: subscription to the Sapling learning online problem sets. URL link to purchase website will be provided (\$40).

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. Problem sets are also assigned, and are completed online at the Sapling learning website.

Reading material corresponding to the headings listed below is available at the course website, 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 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.



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

Homework 1 (HW1): Go to Sapling Learning



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

HW 2



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"

HW 3-1 and 3-2



MIDTERM: after completion of topics associated with water.

APPROXIMATE DATE: 8th week of classes Oct. 25-30 – in class

**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

HW 4

**Polymers**

Natural polymers, addition polymerization

Condensation polymerization; polyamides, functional groups

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

HW 5

**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

HW 6

**DNA: The Body's Blueprint**

The structure of deoxyribonucleic acid

DNA: the code for proteins

Genetic Engineering vs. selective breeding

HW 7



12/15: (Friday) FINAL EXAM, 8:30 am -10:00 am, place to be determined (bring pencils)

Instructor Contact Information

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

Course Requirements and Grading

The final grade for the course is based on a score, which is the sum of the scores received for the following:

30% lab grade ¹

15% online problem sets (graded)

25% midterm exam

5% attendance

25% final exam grade

EXAMS 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.**

The **final exam** for is scheduled for **Friday, December 15, 2017 from 8:30 am - 10:00 am.** **Place to be determined.** Bring pencils. The final exam will focus on material from the second half of the course but not exclude material from the first half. Questions related to lab experiments may also appear on exams. Bring pencils!!! Be sure to arrive on time. **Exams will not be available after the first student leaves OR after 9:00 am (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.**

¹ Laboratory Schedule

NOTE: Labs meet EVERY WEEK.

Lab meeting 1: Check-in, lab techniques. Intro to Experiment 1.

Lab meeting 2 & 3: Examination of the Physical and Chemical Properties of Matter

Lab meeting 4: Energy Powers Physical and Chemical Changes

Lab meeting 5: Name that Ion: Qualitative Analysis

Lab meeting 6: Accounting for Every Atom: Moles in Chemical Reactions

Lab meeting 7: Carbon Dioxide: an All-too-common reaction product

Lab meeting 8: Bonding in Molecules: How Electrons control Physical and Chemical Properties

Lab meeting 9 & 10: An Experiment in 'Cleaning' Water

Lab meeting 11: Chromatography: Pigments in a Spinach Leaf

Lab meeting 12: Ester Synthesis: An Experiment that Smells Good

Lab meeting 13: Building Molecules with Models

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, Ms. Grace Kosiorek 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. 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) 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 http://www.brooklyn.cuny.edu/web/off_registrar/2017-2018_Undergraduate_Bulletin.pdf