JOHN JAY COLLEGE OF CRIMINAL JUSTICE / CUNY

860 Eleventh Avenue, New York, NY 10019

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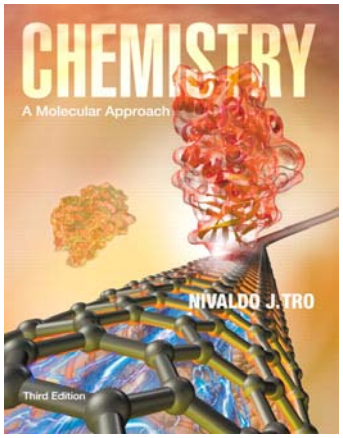
GENERAL CHEMISTRY I (CHE 101) FALL 2013 SYLLABUS

	Professor	*Office (NB)*	*Phone*	*E-mail*	*Office Hours*	*Room (NB)*	*Period*
Lecture– 01 *(4799)*	Rachel Boyll	03.61	use email →	RBoyll@jjay.cuny.edu	Teaching days w/o	L2.85	M/W-5
Recitation – 01	Arie Zask	03.61	use email →	AZask@jjay.cuny.edu	appt. & by appt.	1.107	M-6
Lecture– 02 *(4798)*	Rachel Boyll	03.61	use email →	RBoyll@jjay.cuny.edu	Teaching days w/o	L2.85	M/W-5
Recitation – 02	Arie Zask	03.61	use email →	AZask@jjay.cuny.edu	appt. & by appt.	1.125	W-6
Lecture– 03 *(4796)*	Rachel Boyll	03.61	use email →	RBoyll@jjay.cuny.edu	Teaching days w/o	L2.85	M/W-5
Recitation – 03	Rosalie Lipovetsky	3.62	use email →	RLipovetsky@jjay.cuny.edu	appt. & by appt.	1.123	M-6
Lecture– 04 *(4794)*	Monica Bartoli	03.61	use email →	MBartoli@jjay.cuny.edu	Teaching days w/o	L.76	M/W-6
Recitation – 04	Anastasiya. Baranova	3.61	use email →	anastasiya.baranova@jjay.cuny.ed	appt. & by appt.	1.87	W-5
Lecture– 05 *(4795)*	Monica Bartoli	03.61	use email →	MBartoli@jjay.cuny.edu	Teaching days w/o	L.76	M/W-6
Recitation – 05	Rosalie Lipovetsky	3.62	use email →	RLipovetsky@jjay.cuny.edu	appt. & by appt.	1.121	M-5



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Period	***Time***
1	**8:00AM**
2	**9:25AM**
3	**10:50AM**
4	**12:15PM**
5	**2:50PM**
6	**4:15PM**
7	**5:40PM**
8	**7:05PM**
9	**8:30PM**

COURSE DESCRIPTION AND OBJECTIVES: This course is primarily intended for students who have not taken high school chemistry or who have received a grade of less than 80% on the Chemistry Regents Examination but are interested in being a Forensic Science and Fire Science major, or are interested in developing a strong knowledge base of general chemistry principles. The course provides students with a better understanding of the chemical world around us and is a prerequisite for more advanced chemistry courses. CHE 101 is the first semester of the two semester CHE 101-102 sequence, which is equivalent in content to CHE 103 but done at a slower pace with emphasis on developing needed skills. Topics include: a review of basic mathematical tools used in chemistry, the structure of the atom, stoichiometric calculations, aqueous solutions, gases, and an introduction to the periodic table of elements. Open to students who have not had high school chemistry, or who received a grade of C and lower in high school chemistry, or who received a grade of less than 80% on the Chemistry Regents. CHE 101 does not satisfy a science course requirement without CHE 102. Co-requisite: MAT 104 or MAT 105. 3 hours lecture, 1 hour recitation. 2 credits. (Offered fall semesters)

REQUIRED LECTURE AND RECITATION READING/MISC MATERIAL:

Lecture Text Bundle (Books a la Carte is an unbound, three-hole punch version of the textbook that is less expensive than the hardcover book and comes bundled with the required online homework software and eText. The textbook chapter under discussion must be brought to class: (It is important ordering is done by ISBN#. Order ISBN- 13:9780321813619.)

Tro, Chemistry, A Molecular Approach (3rd ed.), Books a la Carte Plus MasteringChemistry with eText – Access Card Package, Boston: Pearson Education Inc., 2014.

Scientific Calculator

One of the TI-30 scientific calculators shown in this syllabus, available at most electronic and department stores, is required to be brought to class each day. (TI-34 and TI-36 calculators are not TI-30 calculators and, therefore, are prohibited.) The calculator must be in the TI-30 group, such as TI-30XA, TI-30XS, TI-30X IIS.

Turning Technologies Response Card NXT (RCXR-03), if issued for this course

Note: You need not purchase this "clicker." You may borrow one from the college through the Science Department at no charge provided you agree in writing to return it on or before Department Exam Day (or within 10 days of dropping the course, whichever occurs first) and agree to replace it with an identical model if it is lost, stolen or damaged. Its estimate cost is $40.00. Failure to timely return either the borrowed clicker in good condition or a purchased replacement clicker will result in an SC "Science Stop" on your registration, financial aid, ability to obtain a transcript, etc. The stop can be removed by returning the clicker to Chemistry Courses Coordinator Francis Sheehan (05.66.16) or his specified designee and having the Loan Agreement you signed to obtain the device canceled in your presence. Allow at least one week for the stop to be removed.

LEARNING OUTCOMES – COURSE

Reasoning

- Demonstrate a basic understanding of chemistry at an entry-level of complexity and analyze real-world chemistry problems
- Understand the creative aspects of historical discoveries in chemistry
- Analyze data and perform basic aspects of statistical analysis

Knowledge

- Outline some of the basic principles of chemistry at an entry-level of complexity
- Understand how the history of scientific investigation relates to core chemical concepts
- Apply algebra and basic mathematical principles to solve chemistry problems that incorporate unit conversions and unknown variables
- Demonstrate an understanding of basic mathematical principles in chemistry; properties and reactions of elements and compounds; physical and chemical properties of solids, liquids, and gases

LEARNING OUTCOMES – DETAILED BY CHAPTER

CHAPTER 1 Learning Outcomes: Students will be able to:

1.1 Atoms and Molecules

- Define atoms, molecules, and the science of chemistry.
- Represent simple molecules (carbon monoxide, carbon dioxide, water, hydrogen peroxide) using spheres as atoms.

1.2 The Scientific Approach to Knowledge

- Define and distinguish between a hypothesis, a scientific law, and a theory.
- Understand the role of experiments in testing hypotheses.
- State and understand the law of mass conservation as an example of scientific law.
- Understand that scientific theories are built from strong experimental evidence and that the term “theory” in science is used much differently than in pop culture.

1.3 The Classification of Matter

- Define matter and distinguish between the three main states of matter: solid, liquid, gas.
- Define and understand the difference between crystalline and amorphous solids.
- Define mixture, pure substance, element, compound, heterogeneous, and homogeneous.
- Differentiate between mixtures and pure substances; elements and compounds; and heterogeneous and homogeneous mixtures.
- Use the scheme on page 7 to classify matter.
- Define and understand the methods of separating mixtures: decantation, distillation, and filtration.

1.4 Physical and Chemical Changes and Physical and Chemical Properties

- Define, recognize, and understand the difference between physical and chemical changes.

1.5 Energy: A Fundamental Part of Physical and Chemical Change

- Define energy, work, kinetic energy, potential energy, and thermal energy.
- State and understand the law of conservation of energy.

1.6 The Units of Measurement

- Understand the importance of reporting correct units with measurements.
- Know the differences between the three most common sets of units: English system, metric system, and International System (SI).
- Know the SI base units for length, mass, time, and temperature.
- Know the three most common temperature scales (Fahrenheit, Celsius, and Kelvin), the freezing and boiling points of water on each scale, and the relationships between the scales.
- Calculate temperature conversions between each scale.
- Know and use the SI prefix multipliers for powers of ten.
- Know and calculate using the derived units of volume and density.

1.7 The Reliability of a Measurement

- Understand that all measurements have some degree of uncertainty and that the last digit in a measurement is estimated.
- Know how to determine the number of significant figures in a measurement using a set of rules.
- Know how to determine the number of significant figures after calculations.
- Distinguish between accuracy and precision.

1.8 Solving Chemical Problems

- Understand dimensional analysis and know how to use conversion factors.
- Understand the problem-solving strategy: sort, strategize, solve, and check.
- Convert from one unit to another.
- Make order-of-magnitude estimations without using a calculator.
- Rearrange algebraic equations to solve for unknown variables.

Impediments to avoid to achieve CHAPTER 1 Learning Outcomes:

• confusing mass and weight
• having difficulty with algebraic manipulation and difficulty converting temperatures between Celsius and Fahrenheit scales is particularly problematic
• equating density with mass
• being unfamiliar with the prefixes used in the metric system or not using them properly (e.g. 1 pm = 1×10^{-12} m vs. 1 m = 1×10^{12} pm)
• using precision and accuracy interchangeably
• not appreciating that in chemistry, measurement yields numbers determined with certain precision and in certain units; both depending on the type of the measuring device
• not finding exact numbers in calculations
• confusing significant figures and decimal places in arithmetic manipulations
• rounding off too soon in calculations or reporting the result to as many figures as the calculator produces
• not understanding the use of a conversion factor of exactly one
• in dimensional analysis problems not seeing that a physical quantity is a multiplication of value and units and, therefore, not performing algebraic operations on both the number and units

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CHAPTER 2 Learning Outcomes: Students will be able to:

2.1 Imaging and Moving Individual Atoms

- Describe scanning tunneling microscopy (STM) and how atoms are imaged on surfaces.
- Define atom and element.

2.2 Early Ideas about the Building Blocks of Matter

- Describe the earliest definitions of atoms and matter (Greeks).
- Know that greater emphasis on observation and the development of the scientific method led to the scientific revolution.

2.3 Modern Atomic Theory and the Laws That Led to It

- State and understand the law of conservation of mass (also from Section 1.2).
- State and understand the law of definite proportions.
- State and understand the law of multiple proportions.
- Know the four postulates of Dalton's atomic theory.

2.4 The Discovery of the Electron

- Describe J. J. Thomson's experiments with the cathode ray tube and understand how they provide evidence for the electron.
- Describe Robert Millikan's oil-drop experiment and understand how it enables measurement of the charge of an electron.

2.5 The Structure of the Atom

- Define radioactivity, nucleus, proton, and neutron.
- Understand Thomson's plum-pudding model and how Ernest Rutherford's gold-foil experiment refuted it by giving evidence for a nuclear structure of the atom.

2.6 Subatomic Particles: Protons, Neutrons, and Electrons in Atoms

- Define atomic mass unit, atomic number, and chemical symbol.
- Recognize chemical symbols and atomic numbers on the periodic table.
- Define isotope, mass number, and natural abundance.
- Determine the number of protons and neutrons in an isotope using the chemical symbol and the mass number.
- Define ion, anion, and cation.
- Understand how ions are formed from elements.

2.7 Finding Patterns: The Periodic Law and the Periodic Table

- Define the periodic law.
- Know that elements with similar properties are placed into columns (called groups) in the periodic table.
- Define and distinguish between metals, nonmetals, and metalloids.
- Identify main-group and transition elements on the periodic table.
- Know the general properties of elements in some specific groups: noble gases, alkali metals, alkaline earth metals, and halogens.
- Know and understand the rationale for elements that form ions with predictable charges.

2.8 Atomic Mass: The Average Mass of an Element's Atoms

- Calculate atomic mass from isotope masses and natural abundances.
- Define mass spectrometry and understand how it can be used to measure mass and relative abundance.

2.9 Molar Mass: Counting Atoms by Weighing Them

- Understand the relationship between mass and count of objects such as atoms.
- Define mole and Avogadro's number.
- Calculate and interconvert between number of moles and atoms.
- Calculate and interconvert between number of moles and mass.

Impediments to avoid to achieve CHAPTER 2 Learning Outcomes:

- not understanding the concept of amu
- failing to recognize the importance of the periodic table as a tool for organizing and remembering chemical facts
- not relating the charges on common monoatomic ions to their position in the periodic table
- underestimating the importance of chapter 2

CHAPTER 3 Learning Outcomes: Students will be able to:

3.1 Hydrogen, Oxygen, and Water

- Know some chemical and physical properties of H_2, O_2, and H_2O.
- Know and understand that compounds, e.g. NaCl, are different from the elements, e.g. Na and Cl_2, from which they are composed.

3.2 Chemical Bonds

- Define and understand the difference between ionic and covalent bonds.
- Describe and understand the formation of an ionic compound from its elements.
- Describe and understand the sharing of electrons in a covalent bond.

3.3 Representing Compounds: Chemical Formulas and Molecular Models

- Define and understand empirical formula, molecular formula, and structural formula.
- Write the empirical formula, molecular formula, and structural formula for simple molecules.

- Recognize and understand the differences between ball-and-stick models and space-filling models.
- Recognize and identify characteristic colors for elements in molecular models.

3.4 An Atomic-Level View of Elements and Compounds
- Identify elements as atomic or molecular.
- Differentiate between atomic or molecular elements and ionic or molecular compounds.
- Know and understand that ionic compounds are composed of formula units and not discrete molecules.
- Know and understand that covalent compounds tend to exist as discrete molecules.
- Know and understand that a polyatomic ion is composed of atoms that are covalently bound to each other.

3.5 Ionic Compounds: Formulas and Names
- Know that ionic compounds are ubiquitous in the Earth's crust as minerals.
- Know and understand the rules for writing formulas for ionic compounds.
- Write formulas for ionic compounds using the charges of the ions and the principle of electrical neutrality.
- Know and understand the rules for naming ionic compounds.
- Write names from formulas and formulas from names of ionic compounds.

3.6 Molecular Compounds: Formulas and Names
- Know and understand the rules for naming molecular compounds.
- Write names from formulas and formulas from names of molecular compounds.
- Write names and formulas for binary acids and oxyacids.

3.7 Summary of Inorganic Nomenclature

3.8 Formula Mass and the Mole Concept for Compounds
- Define formula mass (a.k.a. molecular weight, molecular mass) and molar mass for a compound.
- Understand and calculate the molar mass of a compound.
- Calculate and interconvert between mass, moles, and molecules of a compound.

3.9 Composition of Compounds
- Define and understand mass percent (mass percent composition).
- Calculate mass percent from a chemical formula.
- Use mass percent as a conversion factor.
- Use chemical formulas as conversion factors in mole calculations.

3.10 Determining a Chemical Formula from Experimental Data
- Convert masses into moles and calculate mole ratios to determine empirical formulas.
- Determine empirical formulas from experimental data.
- Determine molecular formulas from empirical formulas and molecular masses.
- Understand combustion analysis.
- Determine an empirical formula from combustion analysis.

3.11 Writing and Balancing Chemical Equations
- Define reactants, products, chemical reaction, and chemical equation.
- Understand how a chemical reaction can be represented by a chemical equation.
- Use coefficients to balance all atoms in a chemical equation.
- Write balanced chemical reactions.

3.12 Organic Compounds
- Define organic compounds.
- Define and understand the differences between alkanes, alkenes, and alkynes.
- Know the names and formulas of the first ten alkanes.
- Identify the common organic functional groups.

Impediments to avoid to achieve CHAPTER 3 Learning Outcomes:

- confusing the subscripts in a chemical formula with the coefficients in front of the formula in a balanced reaction equation
- thinking that polyatomic ions can easily dissociate into smaller ions
- having difficulty grasping the meaning of a mole as a "collective," a mole of a substance contains a fixed number (6.022×10^{23}) of "building blocks" (atoms for most elements, molecules for molecular substances, formula units for ionic substances) in the same fashion as a dozen means 12 (eggs, people, items, etc.)
- not understanding that mass of 1 mole of substance X can be significantly different from the mass of 1 mole of substance Y
- not appreciating that the coefficients in an empirical formula are not exact whole numbers because of experimental or round-off errors and not understanding the existence of experimental error
- not seeing the difference between empirical and molecular formulas
- not realizing that an ionic compound can consist of nonmetals only, e.g., $(NH_4)_2SO_4$
- confusing the guidelines for naming ionic compounds with those for naming binary molecular compounds

CHAPTER 4 Learning Outcomes: Students will be able to:

4.1 Climate Change and the Combustion of Fossil Fuels

- Define and understand the greenhouse effect and greenhouse gases.
- Understand the role of carbon dioxide from fossil fuel combustion with respect to global warming.

4.2 Reaction Stoichiometry: How Much Carbon Dioxide?

- Define and understand stoichiometry, the numerical relationships among chemical amounts in a balanced chemical reaction.
- Understand and use a balanced chemical reaction to calculate the mole relationships between components.
- Calculate the mass of a reactant needed to produce a certain mass of product.
- Calculate the mass of a product formed from a certain mass of reactant.

4.3 Limiting Reactant, Theoretical Yield, and Percent Yield

- Define limiting reactant and theoretical yield.
- Predict a limiting reactant using initial reactant masses and the theoretical yield.
- Calculate and determine a theoretical yield and a percent yield.
- Understand and describe the role of gasoline additives in the combustion of vehicle fuels.

4.4 Solution Concentration and Solution Stoichiometry

- Define solution, solvent, solute, aqueous solution, and molarity.
- Calculate the molarity of a solution.
- Use molarity as a conversion factor in calculating numbers of moles and volumes of solution.
- Calculate the concentration after a solution has been diluted.
- Calculate reaction component amounts using volume, moles, concentration, and stoichiometry.

4.5 Types of Aqueous Solutions and Solubility

- Understand the interactions between water as a solvent and different solutes dissolved in it.
- Define and understand electrolyte, strong electrolyte, weak electrolyte, and nonelectrolyte.
- Define strong and weak acids.
- Understand what is meant by soluble and insoluble.
- Know the solubility trends for compounds made from common anions and cations.

4.6 Precipitation Reactions

- Define precipitate and precipitation reaction.
- Use the solubility trends to predict how the ions from soluble compounds combine to form precipitates.

4.7 Representing Aqueous Reactions: Molecular, Ionic, and Complete Ionic Equations

- Write and describe a molecular equation that shows complete electrically neutral formulas for each compound in a reaction.
- Write and describe a complete ionic equation that shows all the individual ions present in a reaction.
- Define and identify spectator ions.
- Write and describe a net ionic equation that shows only the species that actually change during a reaction.

4.8 Acid-Base and Gas-Evolution Reactions

- Define acid-base reaction (neutralization) and gas-evolution reaction.
- Understand the Arrhenius definitions for acids and bases.
- Recognize diprotic and polyprotic acids from chemical formulas.
- Know the lists of strong acids and bases.
- Describe what happens in an acid–base reaction.
- Understand the equivalence point of a titration, and use solution stoichiometry and equivalence point to calculate the concentration of an unknown in a titration.
- Recognize gas-evolution reactions and predict the identity of evolved gases.

4.9 Oxidation–Reduction Reactions

- Define oxidation, reduction, and oxidation-reduction (redox) reactions.
- Assign oxidation states to atoms in a chemical formula.
- Identify the elements undergoing oxidation and reduction in a redox reaction.
- Understand that combustion is a common redox reaction.

Impediments to avoid to achieve CHAPTER 4 Learning Outcomes:

- forgetting molarity is moles of solute per liter of solution, not per liter of solvent
- using moles instead of molarity in $M_{initial}V_{initial} = M_{final}V_{final}$
- disregarding rules for significant figures when calculating or using molarities
- not understanding that the reagent that gives the smallest amount of product is the limiting reactant
- thinking a percent yield in excess of 100% is a good thing
- not understanding the difference between the amount of material present in the laboratory (or given in the problem) and the number of moles required by stoichiometry
- thinking that water is a good conductor
- having a problem with the arbitrary difference between strong and weak electrolytes
- thinking that nonelectrolytes produce no ions in aqueous solution at all
- not being able to tell the difference between dissolution and dissociation
- confusing the symbols $\rightleftharpoons$ (equilibrium) and $\Leftrightarrow$ (resonance)
- not seeing that the net ionic equation for the reaction between strong acids and strong bases is always $H^{+}_{(aq)} + OH^{-}_{(aq)} \rightleftharpoons H_2O_{(\ell)}$
- trying to split polyatomic ions into smaller ions when they write net ionic equations
- thinking that a compound consisting of nonmetals only must be molecular (counter-example: $(NH_4)_2SO_4$ which is ionic!)
- not realizing that insoluble really means poorly soluble
- not appreciating the difference between equivalence point and end point
- thinking that an oxidation necessarily involves a reaction with oxygen and/or addition of an atom of oxygen to the formula
- thinking that all atoms of the same element must have the same oxidation number and that this number is uniquely related to the atom's location in the periodic table
- not realizing the equivalence point of a titration is the point where the stoichiometrically correct number of moles of each reactant is present and the end point of a titration is the point where the indicator changes and that they are not the same even though we choose an indicator that will change as close to the equivalence point as possible

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CHAPTER 5 Learning Outcomes: Students will be able to:

5.1 Breathing: Putting Pressure to Work

- Define pressure and understand how differences in pressure lead to the act of breathing.

5.2 Pressure: The Result of Molecular Collisions

- Understand pressure from a molecular point of view.
- Understand examples of pressure: wind and pressure imbalance on the eardrum.
- Understand why pressure can be measured in mm of Hg, and convert between the different pressure units.
- Understand the origin of the two numbers for blood pressure.

5.3 The Simple Gas Laws: Boyle's Law, Charles's Law, and Avogadro's Law

- Know and be able to rationalize Boyle's law, the inverse relationship between volume and pressure.
- Use the inverse mathematical relationship between pressure and volume to solve initial and final states problems at constant temperature and amount.
- Know and be able to rationalize Charles's law, the direct relationship between volume and temperature.
- Use the direct mathematical relationship between volume and temperature to solve initial and final states problems at constant pressure and amount.
- Know and be able to rationalize Avogadro's law, the direct relationship between volume and amount (moles).
- Use the direct mathematical relationship between volume and amount to solve initial and final states problems at constant pressure and temperature.

5.4 The Ideal Gas Law

- Know and understand how the ideal gas law combines the three simple gas laws into one equation.
- Calculate using the ideal gas law and the gas constant, *R*, with the appropriate value and units.

5.5 Applications of the Ideal Gas Law: Molar Volume, Density, and Molar Mass of a Gas

- Define standard temperature and pressure and molar volume of an ideal gas.
- Know and understand the relationship between molar volume, molar mass, and density.
- Calculate using density, molar mass, and molar volume.

5.6 Mixtures of Gases and Partial Pressures

- Define and understand partial pressure of a gaseous component in a mixture.
- Define and determine mole fraction of a component in a mixture.
- Know and understand that Dalton's law of partial pressures relates to mole fraction of a gas to the partial pressure of the gas.
- Understand how the total pressure affects the partial pressures of gases in blood, especially during deep-sea diving.
- Know and understand the technique of collecting gases over water.

5.7 Gases in Chemical Reactions: Stoichiometry Revisited

- Understand how stoichiometry applies to gases via the number of moles in the ideal gas law.
- Understand how stoichiometry relates to molar volume.

5.8 Kinetic Molecular Theory: A Model for Gases

- Define kinetic molecular theory for gases.
- Understand each of the three postulates/assumptions of the kinetic molecular theory.
- Understand how the kinetic molecular theory explains Boyle's, Charles's, Avogadro's, and Dalton's laws.
- Follow the derivation of the ideal gas law from the kinetic molecular theory.
- Understand that all gases at the same temperature have the same kinetic energy, and understand the relationship between speed and molar mass.
- Understand the graphical representation of the distribution of molecular speeds.

5.9 Mean Free Path, Diffusion, and Effusion of Gases

- Define and understand *mean free path*.
- Define diffusion and effusion and understand how they are related to the kinetic molecular theory.

5.10 Real Gases: The Effects of Size and Intermolecular Forces

- Understand that the ideal gas law is an approximation that works well under certain circumstances and not so well at low temperature and/or high pressure.
- Understand that nonideal behavior arises from the finite volume of gas particles and the intermolecular forces between particles.
- Recognize and identify the components of the van der Waals equation.

<u>Impediments to avoid to achieve CHAPTER 5 Learning Outcomes:</u>

- forgetting to use temperature in Kelvin in gas problems
- because there are several systems of units, using ideal gas constants with units inconsistent with values
- confusing the standard conditions for gas behavior (STP) with the standard conditions in thermodynamics
- not recognizing that ideal gas behavior should discussed as just that, ideal, and not recognizing that real gases do not behave ideally, especially at high pressures and/or low temperatures
- expecting a change in the gas particle distribution upon temperature changes at constant V
- confusing effusion and diffusion

WORTH MENTIONING AGAIN!

Make sure you have a valid JJ email address listed on Blackboard. Otherwise you will not receive email announcements from your professors. Even if the email address listed for you on Blackboard is not correct you are responsible for all emails sent to the class via Blackboard. Check and, if necessary, update your profile on Blackboard today.

When emailing your professor,

- **use a meaningful subject line starting with the course and section, such as "Che 101-04 Question about MasteringChemistry password."**
- **include your full name in the body of EVERY email you write related to this course.**

Attendance and punctuality counts.

Keep up with the MasteringChemistry homework.

Yes, the homework is graded and can make a significant difference in your course grade.

Bring the chapter under discussion and your approved calculator with you to class every day.

If a clicker is assigned, take care of it. You will have to replace it if it is damaged, lost or stolen.

The provisions of this syllabus will be strictly enforced. Keep a copy of this syllabus with you when at the college and refer to it often.

Help us help you succeed. Study each chapter by reading it at least twice before class, do as much online homework as you can, show up on time prepared, participate in class, ask questions as needed, and then re-read each chapter at least two more times after the lecture and finish the homework.

Study, study and then study some more. The more you study the "luckier" you will be on the next exam.

Prerequisites
Open to students who have not had high school chemistry, or who received a grade of C and lower in high school chemistry, or who received a grade of less than 80% on the Chemistry Regents. Co-requisite: MAT 104 or MAT 105.

GRADING POLICY: This two credit course has two components—lecture and recitation. Each component has a separate grading policy which contributes a percentage to the overall course grade. In general, the course grade is the sum of the grades earned in the lecture (90%), and recitation (10%) sessions. There is no lab component to Che 101. The laboratory exercises will be performed in Che 102. Unethical/unprofessional conduct will result in a failing course grade and referral for additional action. Deviation from this syllabus, which represents a contract, are not permitted except in extraordinary circumstances applicable to all sections. A TI-30 model calculator is required for this course. See calculator details in this syllabus. Students not seated along a wall may use a tablet or laptop in the classroom but only to view their e-book, class PowerPoints, or take notes. Students using a computer along a wall or viewing social media or non-chemistry related data during class time even for a short period of time will be marked absent and may be subject to other sanctions.

Lecture: Four lecture exams will be given. The lowest grade on the first three exams is dropped and each of the grades on the remaining two exams constitute 25% of the course grade (50% for both). There are no make-up exams. The policy of dropping one exam was instituted to accommodate absence and extraneous circumstances resulting in an uncharacteristically poor performance. During final exam week a fourth lecture exam is given that counts as 40% percent of the course grade. The grade on the fourth exam cannot be "dropped." If clickers are assigned, students may earn 5% of their Exam 4 grade added to their Exam 4 grade by achieving an in lecture correct clicker response grade of at least 75% for the semester. After week one, students who do not bring a required clicker to a class and use it when requested will be marked absent. Each excessive absence (more than four) or failure to meaningfully participate in lecture sessions will result in a 5% reduction per occurrence of the overall lecture grade.

Recitation: Recitation constitutes 10% of the course grade, based on successfully completing twelve of fourteen online homework assignments by their due dates, as well as attendance and meaningful participation in the recitation sessions. Active participation during the recitation sessions by all students benefits all students, providing varying approaches to mastering the subject material, incentive for success, and progress evaluation. Consequently, attendance and participation are NOT optional. Each excessive absence (more than two) or failure to meaningfully participate in recitation sessions will result in a 10% reduction per occurrence of the grade total earned on the assigned online homeworks. After week one, students who do not bring a required clicker to a class and use it when requested will be marked absent.

Overall Grade: The lecture grade (90.00 pts max) is added to the recitation grade (10.00 pts max), producing the final course grade.

ATTENDANCE POLICY: Students enrolled in this course are *required* to attend all lecture and recitation sessions of the section for which they registered. In general, there are two one period lecture sessions and a one period recitation session each week. (During summer session, two weeks of classes are covered each calendar week.) Excessive absences (defined above) will result in a reduction in the grade. Attendance is taken solely from roll sheets circulated at the beginning and/or end of each session. Lateness or early departure (resulting in missing no more than 15 minutes of a session) counts as ½ absence. Students missing more than 15 minutes of a session will be counted as absent. If the college is officially closed, thereby canceling all classes, an announcement will be found on 237-8000, and broadcast on AM stations WINS (1010), WOR (710), WCBS (880), WADD (1280), WMCA (570), WLIB (1190), and WFAS (1230), as well as FM stations WCBS (101.1) and WBLS (107.5). If a class will be cancelled for extraordinary circumstances, the instructor will email an announcement using Blackboard to enrolled students as soon as practicable. This has not happened in recent memory.

ACTIVE COLLEGE E-MAIL/BLACKBOARD ACCOUNT REQUIRED: Students are expected to maintain active and accessible college email and Blackboard accounts. Blackboard will be used to send emails and may be used to post announcements, handouts, additional study materials, text supplements, grades, etc. Use the CUNY Portal Login page help features for a forgotten username or password, or contact DoIT, 212-237-8200 for other help. Verify your CUNY email address is correctly listed on Blackboard and keep the mailbox from filling up and refusing delivery, because you will be responsible for the contents of any email sent to that account. When emailing instructors for this course, start the email's subject line with the course and section number (e.g., Che 101-01) followed by a brief description. Include your full name in the body of every email. Emails that do not contain these descriptive details may be considered spam, and remain unopened and unanswered. Students are expected to check email regularly.

TUTORING: Although a considerable amount of remediation is done during the course, when necessary students are encouraged to attend-- on a first come, first served basis—free tutoring offered to students requesting such help. Scheduled weekly or biweekly appointments are encouraged. "Crash" sessions immediately before an exam are discouraged. A student who fails an exam (less than 60.00%) is required to sign into and attend at least one hour of tutoring weekly until the next exam. An additional hour of tutoring is required for every seven days, or part thereof, homework is past due. (The homework must still be completed.) Failure to sign in and attend required tutoring and provide attendance documentation counts as a recitation absence per occurrence. Attendance at tutoring is automatically forwarded to the instructor by the Math and Science Resource Center.

HOMEWORK: Graded online MasteringChemistry® (**MC**) assignments must be successfully completed by their due dates to receive full credit. Some credit will be awarded for late assignments. Frankly, the knowledge you gain by doing the assignments, even if late, justifies the effort even if no credit were awarded. You will be emailed (using Blackboard) your MasteringChemistry course code which you will use to register for your specific course and section on MasteringChemistry. You may switch sections on MasteringChemistry later but all your homework data and grades up to that point will be lost, so register correctly the first time. Use your JJ email address as your Login ID. Although more information will be sent to you in an email, for now please do not use your SSN anywhere on the site. Homework is also shown on this syllabus. The exercises at the back of each chapter in the text are grouped by topic. Do as many red numbered textbook problems in each group as possible. The answers at the back of the book should only be used after a thorough attempt at answering each problem has been made. Much is learned from the struggle to derive the correct answer. Much is lost by simply seeing "how the book does it." You may do the MasteringChemistry problems before or after the textbook problems. Be prepared to provide answers in recitation to exercises similar to those listed as homework in this syllabus. We have made great effort to ensure that ample tools are available to help students succeed in this course, if the tools are used diligently.

WRITING ACROSS THE CURRICULUM (WATC): Reports written by Forensic Scientists must be clear, concise, and unambiguous. Consequently, where a homework assignment requires a written explanation, spelling, grammar, and clarity of expression will be considered in determining the "correctness" of the answer proffered. It is important that careful attention is directed to writing what you mean and meaning what you write.

STUDENTS WITH DISABILITIES: Qualified students with disabilities will be provided reasonable academic accommodations if determined appropriate by the Office of Accessibility Services (OAS), 212-237-8031, located in room L.66.00. Prior to granting disability accommodations, verification of a student's eligibility must be timely received from OAS by the chemistry course coordinator, Professor Francis Sheehan (FSheehan@jjay.cuny.edu), and the instructor, from the OAS. It is the student's responsibility to initiate contact with the OAS and to follow the established procedures for having the accommodation notice sent to both the course coordinator and the instructor.

ACADEMIC INTEGRITY: Students who succeed in this course and graduate with a degree in Forensic Science may be hired by government or private agencies to analyze evidence and testify in a court of law, placing in jeopardy another person's reputation and/or liberty. Dishonesty of any kind cannot and will not be tolerated. Students are expected to become thoroughly aware of the "John Jay College Policy on Academic Integrity" (and other college policies), available on the college's Web site. Sanctions to the extent permitted by the policy will be imposed and any written material submitted may be transmitted by the instructor to Turnitin.com (or equivalent service) to help analyze its originality. See the Undergraduate Bulletin for the College's Policy on Plagiarism and Cheating, which will be strictly enforced. Plagiarism includes copying ASA or homework answers from others. A handout will be provided you so that there will be no misunderstanding of what constitutes plagiarism. You are required to do your own work to avoid severe grade and disciplinary penalties. Use of a headset at any time is prohibited. The College subscribes to Turnitin.com and Blackboard has a similar module called SafeAssign. Any written assignments submitted may be subject to evaluation by these or similar programs.

Statement of the College Policy on Plagiarism

Plagiarism is the presentation of someone else's ideas, words, or artistic, scientific, or technical work as one's own creation. Using the ideas or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism. It is the student's responsibility to recognize the difference between statements that are common knowledge (which do not require documentation) and restatements of the ideas of others. Paraphrase, summary, and direct quotation are acceptable forms of restatement, as long as the source is cited. Students who are unsure how and when to provide documentation are advised to consult with their instructors. The Library has free guides designed to help students with problems of documentation. (John Jay College of Criminal Justice Undergraduate Bulletin, http://www.jjay.cuny.edu/academics/654.php, see Chapter IV Academic Standards.)

Note: You will be presented with a handout called "The Perils of Plagiarism" that you will be required to read and return signed to your professor on the next meeting date.

Extra Work:

Extra work (more studying, more practice exercises) is encouraged to help you improve your performance on an *upcoming* exam or lab. The grade for the course is strictly computed as defined on the previous page. Students must focus on doing well on the standardized assessments (exams, online homework, lab work, class participation, attendance, etc.) on the assessment date stated on this syllabus. The time to do the extra work is before the exam is given and/or the lab is performed, as extra work after-the-fact is not provided. The grading policy stated herein sufficiently accommodates an unexpected absence and uncharacteristic poor performance during the semester.

Grade of Incomplete:

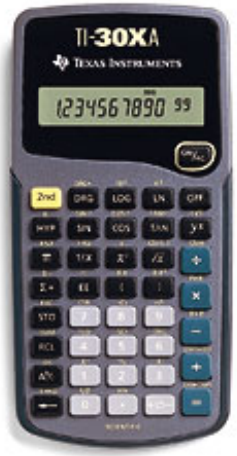
A grade of incomplete will only be issued if the student is absent from Exam 4 and/or the Lab Exam and the average of the best two of the first three exam grades applied to the missed Exam 4 and/or Lab Exam results in a passing grade. If a grade of Incomplete is assigned, it is the student's responsibility to resolve it during the following semester on the specific date published on the Undergraduate Academic Calendar on www.jjay.cuny.edu. The exam(s) must be scheduled at least two weeks in advance via email with the Chemistry Courses Coordinator (FSheehan@jjay.cuny.edu), who will administer the exam(s). The exam(s) will only be administered on the published date, except in extraordinary documented circumstances . Incompletes must be avoided because they will prevent advancement to more advanced chemistry courses the following semester since successful completion of this course is a pre-requistite for more advanced chemistry courses. Incompletes that remain unresolved after the published make-up date are automatically changed to FIN.

"SC" Science Equipment/Key Registration Stop:

If equipment is issued to you, timely return it. Did you know that an "SC" Science Equipment/Key Stop (also known as Hold) restricts students from registrating, receiving financial aid, requesting transcripts, receiving certification letter of attendance, receiving the diploma, etc.? JJC Policy Reg.017 12/15/12

COME TO LECTURE/RECITATION PREPARED:

Do your homework. Stay up with the course material. Stay slightly ahead of the professor with your studying. You will need a blue or black ink pen to sign the attendance sheet, a TI-30 calculator, your notebook and any book/manual required. Although a TI-30XA is the preferred calculator for the course, any TI-30 calculator is acceptable (e.g., TI-30XA, TI-30XS, TI-30XIIS, etc.).

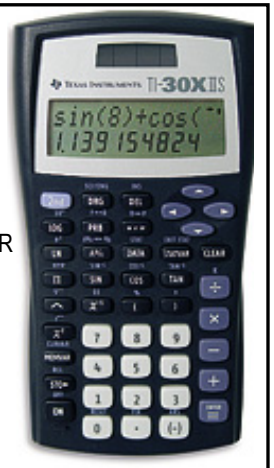


TI-30XA

OR

TI-30XS

OR

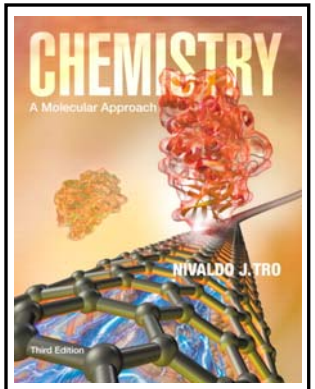


TI-30X IIS

AND

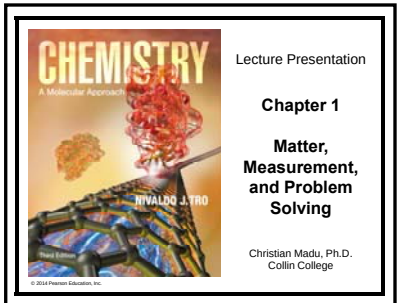
Turning Technologies NXT (RCXR-03)
(if issued)

AND



The chapter under discussion must be brought to class.

AND



If PowerPoint slides are used in class and posted in advance for you to download, print them and bring them to class so you may take notes on them.

COME TO LAB PREPARED:

Do the assigned Advance Study Assignment (ASA) before coming to class. Thoughly read the lab exercise to be conducted and prepare questions to ask regarding anything you don't understand about the procedure. You will need a blue or black ink pen to sign the attendance sheet, a TI-30 calculator, safety glasses on lab days, your notebook and the lab manual. Dress appropriately for lab work, as described on the safety rules. Bring your Z87.1 approved splash resistant safety glasses or goggles. You will not be allowed to be in the lab (and will be marked absent) if you are not dressed appropriately for lab (as described on the safety rules) or if you do not have and wear Z87.1 splash approved safety glasses or goggles while in the lab.

PREPARE FOR EXAMS AND THEN COME TO EXAMS PREPARED:

Study, study and then study some more. The more you study the "luckier" you will be in earning a high grade. If you are ever unsure of what to do on an exam day, check the lab door, 3.66NB, for instructions.

Arrive early:

If you don't have a class immediately prior to the exam, please arrive approximately 15 minutes before your scheduled exam. The attendance sheet will be circulated in the hallway outside the classroom. Note your seat number as you sign the attendance sheet. The seat number will be the four digit number in the middle column, immediately to the left of your signature. It will likely not be your usual seat number. Remember or write down that number, as you will need to know it when you enter the classroom.

Sit in assigned seat:

When instructed to enter the classroom, enter and sit in the seat labeled with your exam seat number.

Follow the instructions of the proctors and hallway monitors:

The proctors assigned to your classroom will walk you through these instructions. It is important that you not try to anticipate what to do next and get ahead of the proctor. Doing so will not result in more exam time. Listen carefully to what they say and follow their instructions so the exam can be promptly started.

Put all materials, including electronic devices, under your seat:

Put all materials other than a pen, pencil and your TI-30 calculator (with its case removed) under your seat. Make sure all chemistry related books, manuals, and notes, as well as rubber bands, PDAs and cell phones,[1] are placed in a closed bag or other opaque covering under your seat and not visible to you or anyone else in the room. It is your responsibility to make sure no one can gain an unfair advantage from material(s) brought with you to the college on exam day. Please note: You are not permitted to have any non-medical electronic devices, notes or other chemistry-related material on your person at any time during exams. If you do not bring a bag or other opaque covering with you on exam day to store your materials under your seat, leave the material(s) at home.

Relax:

The exam will fairly assess the chapters/topics you were told would be on the exam.

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[1] Cell phones, PDAs, and similar devices, and their accessories, may not be accessible, accessed or used during the exam for any purpose. (If truly extraordinary circumstances, such as a seriously ill family member, requires the cell phone to be on vibrate, write your name and seat# on the envelope provided by the proctor, who will store the phone on the front desk and provide it to you should it vibrate.)

Che 101 Lecture Schedule

LEC	DATE*	TOPICS / Readings	TEXTBOOK EXERCISES (Also see MC homework note on right)
1	(08/28)	Course Intro; Ethics, Science and the Scientific Method; MC 1.1 Atoms and Molecules 1.2 The Scientific Approach to Knowledge	 33, 35
2	09/09	1.3 The Classification of Matter 1.4 Physical and Chemical Changes and Physical and Chemical Properties	37, 39, 41 43, 45, 47, 49
3	(09/11)	1.5 Energy: A Fundamental Part of Physical and Chemical Change 1.6 The Units of Measurement	 51, 59, 67, 71
4	09/16	1.7 The Reliability of a Measurement 1.8 Solving Chemical Problems	77, 79, 83, 85, 87 89, 93, 95, 98
5	(09/18)	2.1 Imaging and Moving Individual Atoms 2.2 Early Ideas about the Building Blocks of Matter	
6	09/23	2.3 Modern Atomic Theory and the Laws That Led to It 2.4 The Discovery of the Electron	31, 33, 35, 39 43, 47
7	(09/25)	2.5 The Structure of the Atom 2.6 Subatomic Particles: Protons, Neutrons, and Electrons in Atoms 2.7 Finding Patterns: The Periodic Law and the Periodic Table	41 53, 57, 59, 61 63, 67, 69
8	09/30	2.8 Atomic Mass: The Average Mass of an Element's Atoms 2.9 Molar Mass: Counting Atoms by Weighing Them	71, 75, 77 83, 87, 89
9	(10/02)	3.1 Hydrogen, Oxygen, and Water 3.2 Chemical Bonds	 2
	10/07	**LECTURE EXAM 1**	**Chapters 1 and 2**
10	(10/09)	3.3 Representing Compounds: Chemical Formulas and Molecular Models 3.4 An Atomic-Level View of Elements and Compounds	17, 23, 25 27, 29, 31
11	10/15	3.5 Ionic Compounds: Formulas and Names 3.6 Molecular Compounds: Formulas and Names	33, 35, 37, 41, 43 47, 49, 51, 53
12	(10/16)	3.7 Summary of Inorganic Nomenclature 3.8 Formula Mass and the Mole Concept for Compounds	55, 57 59, 61, 65, 67
13	10/21	3.9 Composition of Compounds 3.10 Determining a Chemical Formula from Experimental Data	71, 75, 81, 83 85, 87, 93, 95
14	(10/23)	3.11 Writing and Balancing Chemical Equations 3.12 Organic Compounds	105, 107, 109 111, 113, 115
15	10/28	4.1 Climate Change and the Combustion of Fossil Fuels 4.2 Reaction Stoichiometry: How Much Carbon Dioxide?	 25, 29, 33
16	(10/30)	4.3 Limiting Reactant, Theoretical Yield, and Percent Yield	37, 41, 45
	11/04	**LECTURE EXAM 2**	**Chapter 3**

Fall 2013 Semester Details

First day of clases: 8/28
No classes: 9/2, 9/4-6, 9/13-14, 10/13-14, 11/28-12/1
Last day of classes: 12/15
Reading Day: NONE
Department Exam Day: 12/16
Finals Week: 12/16 – 12/23

Occasionally due to classroom space limitations on Dept. Exam Day, another day, 12/17–12/23, is used to give General Chemistry Departmental Exams.

Do not make vacation or other plans for any part of 12/16-12/23 because exam dates are subject to change.

SYMBOLS USED IN THIS SYLLABUS
S or s = Study. Each time you see the letter it should be a reminder to study. The more you study, the "luckier" you will be come exam time.

◊ **Tuesday 10/15 is a JJ Monday. Monday classes meet. Tuesday classes do not meet.**

† **Last day to withdraw without academic penalty is Friday, 11/08**

‡ **Last Day of Classes, 12/15**

MC **= MasteringChemistry®**
= required and graded online homework.
Go to http://MasteringChemistry.com

LOANED CLICKERS – AVOIDING THE STOP

Students who drop or withdraw have 10 days from the drop or withdrawal date to return a Loaned Clicker to avoid the "SC" Science Department stop. For all others, issued Clickers must be returned and Loan Agreement cancelled by 12/16 at 5pm to avoid an "SC" Science Dept. equipment registration stop being imposed.

Timely Return or Replace the Clicker

LECTURE	DATE*	TOPICS / Readings	TEXTBOOK EXERCISES (Also see Mchomework note on right)
17	(11/06) †	4.4 Solution Concentration and Solution Stoichiometry 4.5 Types of Aqueous Solutions and Solubility	53, 55, 57, 59, 63 71, 73
18	11/11	4.6 Precipitation Reactions	75, 77
19	(11/13)	4.7 Representing Aqueous Reactions: Molecular, Ionic & Complete Ionic Equations 4.8 Acid-Base and Gas-Evolution Reactions	79, 80, 81 85, 87, 89
20	11/18	4.9 Oxidation-Reduction Reactions	91, 93, 95, 97
21	(11/20)	5.1 Breathing: Putting Pressure to Work 5.2 Pressure: The Result of Molecular Collisions 5.3 The Simple Gas Laws: Boyle's Law, Charles's Law, Avogadro's Law	 25, 27, 29 31, 33, 35
	11/25	**LECTURE EXAM 3**	**Chapter 4**
22	12/02	5.4 The Ideal Gas Law 5.5 Applications, Ideal Gas Law: Molar Volume, Density, and Molar Mass	37, 39, 41, 45 53, 55, 57, 59
23	(12/04)	5.6 Mixtures of Gases and Partial Pressures 5.7 Gases in Chemical Reactions: Stoichiometry Revisited	61, 63, 65, 67 71, 73, 75
24	12/09	5.8 Kinetic Molecular Theory: A Model for Gases	81, 83
25	(12/11)‡	5.9 Mean Free Path, Diffusion, and Effusion of Gases 5.10 Real Gases: The Effects of Size and Intermolecular Forces	85, 87, 89 91, 92, 93
	12/16	**LECTURE EXAM 4**	**Chapter 5**

If Clickers are issued in this course,

STOP THE STOP **RETURN THE LOANED CLICKER WITHIN TEN DAYS OF WITHDRAWING/ DROPPING THE COURSE OR BY DEPARTMENT EXAM DAY, 12//16, WHICHEVER OCCURS FIRST**	Email FSheehan@jjay.cuny.edu in advance of the deadline to make arrangements to return the Clicker or submit an identical replacement by the deadline, to cancel your Clicker Loan Agreement.
Did you know that an "SC" Science Equipment/Key Stop (also known as Hold) restricts students from registering, receiving financial aid, requesting transcripts, receiving certification letter of attendance, receiving the diploma, etc. JJC Policy Reg.017 12/15/12	GOT THE MESSAGE? **We want the clickers back so other students may benefit from their use.**

THE MATHEMATICS & SCIENCE RESOURCE CENTER (MSRC) IS AVAILABLE TO HELP

Tutoring is available free of charge for this course in the Mathematics & Science Resource Center (MSRC). The center also has a computer lab with internet access and a room for quiet study.

How do you get the most out of a tutoring session?

i. *Start right away*. Students who begin tutoring from the beginning of the semester typically do better than those who wait.

ii. *Book your appointments early*. During peak times, you may need to book at least a week in advance to get the times you want. To book your own appointments over the web, first read the instructions on the MSRC web site, then log on to TutorTrac at the URL below.

iii. *Come prepared*. Please bring your class notes and textbook. Look over the reading and try the problems. If you can, bring a list of specific questions. The more you prepare, the more you will get out of the session.

iv. If you miss a class, please get notes from a classmate *before* your session. Tutoring is not a substitute for attending class.

v. If you are repeating the course (previous grade of "F" or "W"), you are eligible to participate in the Math Advancement Program (MAP) which provides weekly one-on-one tutoring with an experienced tutor. The deadline to sign up for the MAP program is Monday, September 9, 2013. Please see Ms. Michele Doney in room 01.94 NB by *5:00 PM* on September 9 for details.

Contact Information for the MSRC:
Room: 01.94 NB:
Phone: (646) 557-4635
Email: msrc@jjay.cuny.edu

MSRC Website:
http://www.jjay.cuny.edu/academics/592.php

TutorTrac (for scheduling appointments):
https://jjctutortrac.jjay.cuny.edu