Comprehensive Course Syllabus
SCI105 Scientific Inquiries-Chemistry

Course Description:
SI Chemistry is a one-semester course designed to engage the students in foundational concepts in chemistry and to prepare them for advanced study in science. The content explored includes: the periodic table and periodic trends, inorganic nomenclature, writing and balancing equations, bonding, molecular geometry, molecular polarity, intermolecular forces, electron configuration, stoichiometric relationships and their applications, chemical equilibrium, and acids and bases. This content is encountered through a combination of lab-based activities, guided inquiry, group discussion and direct instruction. Each unit of study incorporates real life applications of the topics covered and highlights the connections between biology and chemistry.

Instructors:

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Office hours by appointment	Office hours by appointment

All classes meet in Room B110

Extra Help: Help sessions will be held from 1 to 3 pm on I-days in B-110.

Course Materials:
Course materials are posted on Moodle for student aquisition.
Calculators and computers are required for calculations and to generate laboratory electronic notebooks.
Students will also need a folder/binder to keep all materials organized.

Student Learning Objectives:
Unit 1:

a. The Periodic Table
b. Periodic Trends
c. Radioisotopes

Unit 2:

a. Nomenclature of Ionic and Covalent Compounds
b. Bonding and Molecular Geometry
c. Molecular Polarity
d. Electron Configuration

Unit 3:

a. Chemical reactions and their types
b. Moles and molar relationships
c. Molarity
d. Limiting reactants
e. Titration

Unit 4:

a. Equilibrium analogies
b. LeChatelier's Principle including energy
c. Acid Equilibria
d. pH and pOH
e. Strong versus weak acids

SSLs and Outcomes:
IA= Informally Assessed; FA=Formally Assessed; NA=Not Assessed; ABNA=Addressed But Not Assessed

I. Developing the Tools of Thought
A. Develop automaticity in skills, concepts, and processes that support and enable complex thought. This is done through lab observations, data collection, graphing, analysis, use of significant figures, and using lab equipment properly. **FA**
B. Construct questions which further understanding, forge connections, and deepen meaning. This is done by analyzing data to draw conclusion and relate it to the concept. **FA**
C. Carefully observe phenomena and accurately record findings. This is done through laboratory observations, data collection and analysis, using estimated digits and significant figures. **FA**
D. Evaluate the soundness and relevance of information and reasoning.
This is done by drawing conclusions from laboratory data. **FA**

II. Thinking About Thinking
A. Identify unexamined cultural, historical, and personal assumptions and misconceptions that impede and skew inquiry. This is done by using Lewis dot structures and looking at Bohr models. **FA**
B. Find and analyze ambiguities inherent within any set of textual, social, physical, or theoretical circumstances. **ABNA**

III. Extending and Integrating Thought
A. Use appropriate technologies as extensions of the mind. This is done through the use of calculators and computers. **IA**
B. Recognize, pursue, and explain substantive connections within and among areas of knowledge. This is done by making historical connections to the scientists as well as mathematical connections. **FA**
C. Recreate the beautiful conceptions that give coherence to structures of thought. This is done through analyzing and learning about molecular structures, atomic structures, and molecular geometry, **IA**

IV. Expressing and Evaluating Constructs
A. Construct and support judgments based on evidence. This is done by laboratory exploration, constructing laboratory reports as well as making generalizations. **FA**
B. Write and speak with power, economy, and elegance. This is done through lab practicals and reports, and writing paragraphs demonstrating their understanding through discussions. **FA**
C. Identify and characterize the composing elements of dynamic and organic wholes, structures, and systems. This is done by applying basic electronic structures to chemical formulas, periodic trends, and properties of substances. **FA**
D. Develop an aesthetic awareness and capability. This is done by drawing attention to links between current content and the world around them. **ABNA**

V. Thinking and Acting with Others
A. Make reasoned decisions, which reflect ethical standards, and act in accordance with those decisions. This is done by not manipulating data to fit conclusions and preventing plagiarism in lab reports. **FA**

Instructional Design and Approach:
Key to the experience of Scientific Inquiries in Chemistry is a student's active participation in the process of scientific investigation. Students work individually and cooperatively to build an understanding of fundamental chemical concepts. The essential experience is grounded in inquiry pursued through laboratory based activities. These activities develop the habits and skills of safe and accurate data acquisition. Analysis, results and conclusions are then communicated and assessed.

Student Expectations:
The experience you have in this course will be directly related to your level of participation!! One cannot choose to be a nonparticipant and expect to reap all of the possible benefits. Therefore, we have established some guidelines for you:
1. Please be on time and ready for class - both mentally and physically. Students who are more than 10 minutes late will be given an unexcused absence since we will have already begun the lab/activity/discussion for that day. Refer to the Student Handbook for specific effects of excessive tardies and absences. There will be NO credit awarded for make-up work due to unexcused absences. It is the responsibility of each student to arrange for make-up work due to excused absences (preferably in advance!).
2. Besides being on time, please have all the materials you will need for the class WITH YOU! Our work on many days will require you to have your laptop computer, lab notebook, calculator and pen/pencil. You should also wear close-toed shoes on all class days. Your lab notebook/laptop will be the only materials allowed in the lab in which to record data. Therefore if you forget it, you cannot participate in the laboratory until you get it.
3. Turning work in late is discouraged. When an assignment has been collected, it may be submitted for late credit at a 10% penalty per day. Once the material has been assessed and returned to any of the SI-Chemistry sections, it cannot be submitted for late credit.
4. No iPODs, MP3/CD players used, sunglasses worn, cell phones on, or food/drinks ingested in the lab.
5. Collaboration is encouraged throughout all facets of this course. Academic dishonesty, however, is not. (Please review the Academic Integrity Policy in your handbook) It is expected that students will discuss laboratory results, and partners will share common data. It is also expected that all reports/work reflect individual thought. All other sources must be referenced appropriately.
6. If, at any point, you are experiencing some confusion - get help ***immediately.*** Concepts cannot build upon each other if one is not understood. DO NOT WAIT- attend scheduled help sessions or schedule an appointment with your teacher.

Assessment Practices, Procedures, and Processes:
A student's grade in this course reflects all aspects of the course. Laboratory reports are submitted for each experiment that is conducted. Formative and summative quizzes are administered frequently to monitor student learning. Homework is also collected and assessed periodically. Points are earned from laboratory work, problem solving activities and presentations, written assignments and formal assessments. 36% of the semester grade is from laboratory work and reports, homework, mini-projects, and other small assignments; 54% is from quizzes and tests, and 10% of the semester grade is from the final exam, which is administered at the end of the term. An A reflects an average of 90% or greater, a B reflects an average of 80% or greater and a C reflects an average of 70% or greater. Major assessments are administered at the conclusion of each unit, usually every 4 weeks. These include both written and laboratory components

Sequence of Topics and Activities: (See Course Calendar)