

# SLO Presentation

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CHEM

Date: 09-15-2022

## ISLO

### Civic Engagement

- Students will develop values and beliefs in their role as a member of local, national and global societies to promote truth, fairness and goodwill to others. They will use the democratic process to further their values and beliefs and recognize and accept differing perspectives based on cultural diversity. They will engage in actions which provide service to others and have a positive impact on their local community.

### Communication and Expression

- Students will demonstrate the ability to effectively and appropriately communicate their thoughts and ideas both in written and oral forms. They will develop verbal and non-verbal delivery skills, in an appropriate manner, to communicate their ideas as well as evaluate the ideas of others in a wide variety of contexts.

### Critical Thinking and Quantitative Reasoning

- Students will demonstrate the ability to recognize assumptions within an argument and actively and skillfully analyze underlying reasoning to develop a conclusion. They will apply qualitative and/or quantitative analysis to solve problems, predict outcomes, test hypotheses, and explore alternatives in an ethical manner.

### Information Literacy

- Students will demonstrate the ability to determine when gathering additional information is necessary. They will use appropriate resources and technologies to locate, evaluate and incorporate the information when developing supporting arguments and drawing conclusions. Students will also develop the ability to understand any legal, ethical or social issues regarding the use of information.

### Personal Knowledge and Responsibility

- Students will develop the necessary skills to define, maintain and complete their personal educational goals. They will learn to work independently to accomplish personal goals toward realizing their full potential academically, physically and emotionally whether for personal enrichment, further education or career advancement.

Science, Engineering, and Math
CHEM
<b>Chemistry--AA</b> <ul style="list-style-type: none"><li>• Students apply the scientific method in lab experiences to interpret information and draw conclusions.</li><li>• Students demonstrate the quantitative skills needed to succeed in chemistry.</li><li>• Students employ critical thinking skills to read and interpret graphs and data.</li><li>• Students recognize connections between concepts across chemistry.</li><li>• Students recognize the impact of science on society.</li></ul>
<b>CSLO</b>
<b>CHEM95B - Tutoring for CHEM 110 - Elementary Chemistry</b> <ul style="list-style-type: none"><li>• 1. Utilize dimensional analysis technique of multistep problem-solving to solve problems</li><li>• 2. Name and write chemical formulas</li><li>• 3. Perform stoichiometric calculations (e.g., predict reaction outcome and perform molar calculations)</li></ul>
<b>CHEM95D - Tutoring for CHEM 112 - General Chemistry</b> <ul style="list-style-type: none"><li>• Predict oxidation and reduction reactions and related calculations</li><li>• Discuss the relationship between electrons and geometry using valence-shell electron-pair repulsion (VSEPR)</li><li>• Analyze data from a lab experiment</li><li>• Understand how to communicate laboratory data in a written lab report</li></ul>
<b>CHEM95E - Tutoring for CHEM 211 - Organic Chemistry</b> <ul style="list-style-type: none"><li>• Name organic molecules</li><li>• Conceptualize stereochemical relationships through drawings</li><li>• Identify compounds through their spectroscopic characteristics</li></ul>

- Show electron flow in a simple organic mechanism
- Predict reactants and products in S<sub>N</sub>1/S<sub>N</sub>2/E1/E2 and addition reactions

### CHEM100 - Introductory Chemistry

- Students analyze the fundamental features of inorganic chemistry as it applies to organic and biochemistry including measurement, mathematical interconversion of physical properties such as mass, volume, density, temperature, solutions.
- Students demonstrate knowledge of the qualitative features of inorganic chemistry as it applies to organic and biochemistry including physical and chemical properties, naming and writing chemical formulas of commonly occurring inorganic compounds and evaluating chemical reactions.
- Students differentiate typical acid and base formulas and compare/contrast the behavior associated with acids and bases including the behavior of buffers.
- Students construct and name structures containing common mono-functional organic molecules and differentiate functional groups when they appear in an organic structure, relate the physical and chemical properties of compounds containing these groups with the structure of each functional classification.
- Students distinguish various roles of four major classes of biomolecules in living cells, distinguish and construct key structural features and common reactions of these classes of biomolecules.

### CHEM105 - Chemistry for Elementary School Teachers

- Students apply critical thinking strategies in solving algorithmic and conceptual problems in chemistry.
- Students apply knowledge of microscopic (molecular) interactions to explain or predict macroscopic properties.
- Students apply laboratory skills to perform chemical analysis including collection of data, computations, and statistical analysis of the results.
- Students incorporate chemical principles to explain lab results and vice versa.
- Students make effective use of current technology to collect, analyze and present data.
- Students use effective written and verbal communication of chemical information.
- Students will use chemical information to solve algorithmic problems.

### CHEM110 - Elementary Chemistry

- Students incorporate chemical principals to explain lab results and vice versa
- Students write correct chemical formulas, predict balanced equations, net ionic equations and total ionic equations.
- Students will use chemical information to solve stoichiometric problems in solid state, solutions and gaseous state
- Students use dimensional analysis to perform unit conversions and chemical calculations.

### CHEM111 - General Chemistry

- Apply knowledge of microscopic (molecular) interactions to explain or predict macroscopic properties
- Apply critical thinking strategies in solving algorithmic and conceptual problems in chemistry
- In lab, incorporate chemical principles to explain lab results and vice versa
- Apply laboratory skills such as lab weighing, drying to constant mass, making solutions, titrations, taking gas measurements, measuring pH, and measuring electrical conductivity to perform chemical analysis including collection of data, computations, and statistical analysis of the results
- Use effective written communication of chemical information in lab reports and on exams
- Make effective use of current technology to collect and analyze data in lab

### CHEM112 - General Chemistry

- Students demonstrate the quantitative skills needed to succeed in Chemistry.
- Students apply the scientific method in lab experiences to interpret information and draw conclusions.
- Students demonstrate the ability to think critically and employ critical thinking skills.
- Students demonstrate the ability to make connections between concepts across General Chemistry.
- Students read and interpret graphs and data.

### CHEM211 - Organic Chemistry

- A. Demonstrate understanding and problem-solving skills in stereochemistry and spectroscopy
- E. In lab, demonstrate motor skills and mastery in basic organic lab techniques
- D. In lab, demonstrate effective written communications in theory and understanding of basic organic chemistry lab techniques

- C. Propose and draw a nucleophilic substitution or elimination mechanism to explain organic product formation
- B. Identify the products of simple and multistep organic reactions of alkanes, alkenes, alkynes, alcohols, and halides

### CHEM212 - Organic Chemistry

- A. Propose multistep synthetic processes for a desired organic compound
- E. In lab, demonstrate motor skills and ability to separate, purify, and identify organic compounds
- D. In lab, demonstrate effective written communications and technological competency through use of instrumentation and computers
- C. Draw reaction mechanisms to illustrate organic reactions and explain product formation
- B. Identify the products of simple and multistep organic reactions of alkenes, alkynes, aromatic compounds, organometallics, alcohols, amines, aldehydes, ketones, and carboxylic acids and their derivatives

### CHEM250L - Special Topics in Chemistry

- Students apply knowledge of chemistry to design or redesign an experiment.
- Students apply critical thinking strategies in solving algorithmic and conceptual problems in chemistry.
- Students incorporate chemical principles to explain lab results and vice versa.
- Students apply laboratory skills to perform quantitative and qualitative chemical analysis including collection of data, computations, and statistical analysis of the results.
- Students use effective written communication of chemical information.
- Students make effective use of current technology to collect and analyze data.

### CHEM299 - Directed Studies

- Students use effective written communication of chemical information.
- Students apply knowledge of microscopic interactions to explain or predict macroscopic properties.
- Students demonstrate informational competency through research projects.