

PROGRAM-SPECIFIC COMPETENCIES - CHEMISTRY

Competencies are the skills, knowledge and attributes gained through every work, educational, volunteer and life experience.

UVic students in the **Chemistry** program develop the following program-specific competencies. We worked with the Department of Chemistry to develop this document.

CHEMISTRY KNOWLEDGE

Acquires knowledge and skills to obtain a professional position or pursue graduate/professional training in chemistry assets and secure the income and value of the business

- + Understands the major systems of nomenclature used in chemistry
- + Understands bonding and electronic structure and how these relate to the shape and reactivity of chemical compounds, and how they impact the chemical, physical and electronic properties of molecules
- + Understands the principles of thermodynamics, reaction kinetics and reaction mechanisms
- + Conducts synthetic studies to create new compounds based on knowledge of inorganic and organic chemical reactions
- + Understands the principles for separating, detecting and measuring chemical compounds and uses both quantitative and qualitative evaluations to analyze compounds or materials

SCIENTIFIC METHOD

Understands and uses the principles of the scientific method and the application of experimental techniques to solve specific problems

- + Uses effective literature search strategies and critically evaluates the scientific literature
- + Uses inductive reasoning and deductive methods to develop a testable, falsifiable hypothesis and predict expected results
- + Designs quantitative approaches/experiments to test and evaluate hypothesis
- + Gathers empirical and measurable evidence through observation and experimentation
- + Demonstrates an excellent level of understanding of the research by proposing future steps required to further the goals of the experiment
- + Communicates results and ideas clearly and effectively into scientific reports, papers and oral presentations, following established chemistry norms

LABORATORY SKILLS

Uses practical and safe techniques within a laboratory setting

- + Uses safe and careful practices at all times
- + Keeps accurate laboratory records
- + Analyzes, synthesizes, purifies, modifies and/or characterizes compounds, samples, or devices
- + Uses instrumentation appropriately
- + Calibrates, maintains and troubleshoots instrumentation
- + Practices basic skills associated with performing laboratory experiments in chemistry by following standard methods and procedures
- + Takes precise and accurate measurements and gains appreciation of potential sources of error associated with laboratory measurements

LABORATORY SKILLS CONT.

- + Troubleshoots and optimizes methods and techniques
- + Develops methods and procedures
- + Gains experience critically evaluating data generated

COMPUTATION

Develops and uses scientific software to support research endeavors

- + Utilizes discipline specific software effectively
- + Develops and uses computation modeling as a proxy for physical experimentation
- + Creates and modifies scientific software
- + Develops and uses computational methods to analyze large data sets

EDUCATION AND TRAINING

Instructs students, colleagues or co-workers in scientific procedure

- + Teaches chemistry and scientific concepts and knowledge at a level appropriate to the audience
- + Assesses achievement of learning outcomes
- + Trains and supervises others to perform scientific/laboratory procedures

FIELD WORK

Conducts research in the field

- + Observes behaviour/properties of subjects/phenomena of interest in situ
- + Makes measurements of the subjects/phenomena or their environment
- + Identifies and collects samples for analysis
- + Operates and uses equipment/tools/machinery appropriately