

# CHEMISTRY (CHEM)

This is a list of the Chemistry (CHEM) courses available at KPU.

Enrolment in some sections of these courses is restricted to students in particular programs. See the Course Planner - [kpu.ca/registration/timetables](http://kpu.ca/registration/timetables) - for current information about individual courses.

For information about transfer of credit amongst institutions in B.C. and to see how individual courses transfer, go to the BC Transfer Guide [bctransferguide.ca](http://bctransferguide.ca)

**Note:** Student with physical, mental, or learning disabilities who need accommodations for courses or labs are required to contact the Services for Students with Disabilities department and encouraged to discuss course learning outcomes with the course or lab instructors.

## **CHEM 1101** **4 Credits**

### **CSI: Chemical Sciences Investigation**

Students will learn introductory chemical concepts framed in the context of the forensic sciences and will perform some of the techniques seen on crime shows. Students will, for example, examine latent fingerprints by fuming and dusting a variety of surfaces, analyze soil samples, and identify a crime scene plastic sample by density analysis and flame tests.

NOTE: This course is intended for students with little background in math and sciences that have a quantitative requirement (or need lab-sciences credit) to complete a degree in a Faculty other than Science (e.g. Arts, Business). This course may not be used as a prerequisite for further chemistry courses. Students with CHEM 1105 or higher may not take this course for further credits towards graduation.

*Attributes: PATH-3, QUAN*

## **CHEM 1105** **4 Credits**

### **Introductory Chemistry**

Students will learn: Chemical formula calculations, stoichiometry, molality of solutions, limiting reagents & percent yields, thermochemistry, freezing point depression, boiling point elevation, liquids and gases, acids and bases, ionic equilibria, chemical equilibria, and oxidation and reduction. They will also perform laboratory work. Students with credit for ENVI 1106 may not take this course for further credit towards graduation requirements.

*Prerequisites: Level E1 as defined in the Math Alternatives Table, and [CHEM 1094, CHEQ 1094, Chemistry 11 (C+) or Chemistry 12 (P)]*

*Attributes: PATH-3*

## **CHEM 1110** **4 Credits**

### **The Structure of Matter**

Students will study the modern view of atomic structure, nuclear chemistry, theories of bonding and molecular structure, organic chemistry (properties and reactions of the major functional groups and isomerism) after a brief review of stoichiometry, gases and the treatment of experimental data. Students will also perform experiments in the laboratory.

*Prerequisites: Level C1 as defined in the Math Alternatives Table, and either CHEM 1105 or Chemistry 12 (C+).*

*Co-requisites: MATH 1112 is strongly recommended.*

*Attributes: QUAN*

## **CHEM 1154** **4 Credits**

### **Chemistry for Engineering**

Students will learn about stoichiometry, gases, liquids, solids and solutions, equilibrium, acids and bases, thermodynamics, and chemical kinetics. They will also perform laboratory work.

Note: This course may not be used as a prerequisite for further chemistry courses. This course is designed for students transferring to an engineering program. Students with credit for CHEM 1210 may not take this course for further credit towards graduation requirements.

*Prerequisites: Level A1 as defined in the Math Alternatives Table, and either CHEM 1105 or Chemistry 12 (C+).*

*Attributes: QUAN*

## **CHEM 1210** **4 Credits**

### **Chemical Energetics and Dynamics**

Students will learn about topics including liquids, solutions, a review of redox reactions, electrochemistry, the laws of thermodynamics, equilibrium, acids and bases, ionic equilibria, and chemical kinetics. They will also perform experiments in the laboratory.

*Prerequisites: Level A1 as defined in the Math Alternatives Table, and CHEM 1110*

*Attributes: QUAN*

## **CHEM 2311** **3 Credits**

### **Physical Chemistry for Life Sciences**

Students will study chemical kinetics, thermodynamics, and spectroscopy at a second year level without some of the mathematical rigor commonly associated with a second-year physical chemistry course. Students with credit for CHEM 3310 may not take this course for further credit.

*Prerequisites: CHEM 1210 and (MATH 1120 or 1130 or (1140 with a C+ or better))*

*Co-requisites: MATH 1220 or 1230*

*Attributes: QUAN*

## **CHEM 2315** **4 Credits**

### **Analytical Chemistry**

Students will learn the fundamental concepts of analytical chemistry. They will study quantitative analysis of aqueous solutions and solid samples, experimental design and data analysis, as well as spectroscopic and chromatographic methods. Students will engage in extensive laboratory work and practical applications.

*Prerequisites: CHEM 1210*

*Attributes: QUAN*

## **CHEM 2320** **4 Credits**

### **Organic Chemistry I**

Students will study the fundamental aspects of modern organic chemistry as illustrated by the structure, physical and spectroscopic properties and reactions of alkanes, cycloalkanes, alkenes, dienes, alkynes, halogen compounds, alcohols, ethers, aldehydes and ketones. They will also perform experiments in the laboratory.

*Prerequisites: Either (a) CHEM 1210 or (b) CHEM 1110 (B)*

*Attributes: QUAN*

**CHEM 2420** **4 Credits****Organic Chemistry II**

Students will study the structure and reactions of aromatics, polycyclic aromatic and heteroaromatic compounds, and their enolates, and an introduction to the chemistry of fats, carbohydrates and proteins. They will also perform experiments in the laboratory. Note: This course is a continuation of CHEM 2320.

*Prerequisites: CHEM 2320*

*Attributes: QUAN*

**CHEM 3310 (formerly CHEM 2310)** **4 Credits****Physical Chemistry**

Students will study chemical kinetics and thermodynamics with the appropriate mathematical rigour. They will also apply these physical chemistry principles in a lab setting. Students with credit for CHEM 2311 may not take this course for further credit.

*Prerequisites: CHEM 1210 and (MATH 1220 or 1230)*

*Attributes: QUAN*

**CHEM 3320** **4 Credits****Natural Products Chemistry**

Students will study naturally occurring compounds, their structural types, structure elucidation, chemical synthesis, biosynthesis, and biological significance. They will also perform experiments in the laboratory to learn how to isolate, purify, identify and modify compounds of natural origin for pharmaceutical use and for other purposes.

*Prerequisites: CHEM 2320*

*Co-requisites: CHEM 2420*

**CHEM 4320** **4 Credits****Drug Discovery, Design & Development**

Students will learn and understand the principles and strategies for drug discovery, design and development. They will examine the chemical and biochemical principles and reactions vital to drug action and drug design using clinically important drugs as examples. Students will study drug activities against different types of targets, for example enzymes, receptors and oligonucleotides. They will learn drug absorption, distribution, metabolism and elimination process. Students will discover drug discovery processes involving hit discovery, lead optimization and drug synthesis.

*Prerequisites: CHEM 2420*

**CHEM 4330** **3 Credits****Modern Alchemy**

Students will investigate aspects of nuclear and radiochemistry: radioactivity; atomic structure and stability; decay processes; interaction of radiation with matter; detection and measurement of radiation; applications of nuclear and radiochemistry.

NOTE: It is recommended that students take (PHYS 1102 or 1220) and (MATH 1220 or 1230) as prerequisites.

*Prerequisites: 45 credits including CHEM 1210*

**CHEM 4399** **3 Credits****Current Topics in Medicinal Chemistry**

Students will discuss topics related to novel and contemporary areas of Medicinal Chemistry appearing in current literature, such as: aspects of drug research; identification and validation of emerging drug targets; drug design approaches; combinatorial methods; drug receptor interactions on the intermolecular level and structure-activity relationships.

*Prerequisites: CHEM 2320 and CHEM 2315*

*Co-requisites: CHEM 2420*

**CHEM 4610** **4 Credits****Instrumental Analysis**

Students will study current mainstream instrumental analysis techniques from both a theoretical and practical perspective. They will discuss the theory behind signal generation and measurement, the importance of optimization of all stages of an analysis, and the theory behind the instrumental techniques to be studied. Students will perform labs to illustrate and reinforce the concepts covered in the lecture.

*Prerequisites: CHEM 2315*