



This program offers solid academic training and practical experience for future chemists. Students acquire basic skills in analytical, inorganic, organic, physical and structural chemistry, learn to become autonomous, and are trained in complex analysis techniques through hands-on laboratory experience as early as their first term. Endorsed by the Ordre des chimistes du Québec, this program also includes courses in mathematics and computer modeling specifically tailored to the professional training requirements for today's chemists.

In the third study term, the program also offers a specialization in environmental chemistry, thus giving the students the means to address environmental issues in multidisciplinary teams. Those who choose this path can contribute to the natural environment projects and design improved processes for environmental applications. An ideal resource to help you achieve your objectives for sustainable development!

## WHAT OUR STUDENTS CAN DO FOR YOU

### Organic

- Improved pharmaceutical compounds
- Green chemistry and organic synthesis
- Reduction, oxidation, alkylation, hydrogenation, crystallization, distillation
- Combinatorial chemistry
- Synthesis of organic molecules with biological activity (in vitro and in vivo)
- Computer modeling of synthetic compounds

### Analytical

- Analysis of raw materials and end products (GC, HPLC, AA, IR, NMR)
- Physicochemical analysis of samples (conductivity, colorimetric, kinetic)
- Mass spectrometry and argon plasma emission spectrometry (MS)
- Sampling and analysis of compounds and their derivatives in the natural environment
- Structural and conformational analysis of proteins (NMR spectroscopy)
- Chromatographic protein purification and analysis methods (flash, CCM)

### Environment and Other

- Assessment and overview of environmental regulations
- Specialized software applications (ChemStation, ChemStore, Excel, SigmaPlot, Maple, Labview, GAUSS)
- Laboratory and pilot plant testing (process, unit operation)
- Quality control
- Experimental physical chemistry (strength of materials, laser)
- Interpreting and reporting lab data



## KNOWLEDGE AND SKILLS

Term	Description
S-1	Basic concepts in organic and inorganic chemistry; quantitative chemical analysis: molecular geometry and 3D representation, aromatic substitution, energy diagrams, electronic structure of atoms, chemical bonds, description of structures, coordination chemistry and organometallic chemistry, gravimetric and volumetric methods.
S-2	IR spectroscopy, NMR, gas-liquid chromatography; distillation; extraction; thin layer chromatography, column chromatography; recrystallization; inorganic chemistry; crystallography; thermodynamics; entropy; chemical and electrochemical potential; useful energy; statistical methods for quality control.
S-3	Spectroanalytical and electrochemical methods: UV/Vis, fluorescence, atomic absorption and emission; gas-liquid chromatography methods; multistage syntheses; carbonyl chemistry; kinetics. Electives: chemistry in the natural environment or basic concepts in pharmacology.
S-4	Basic concepts in molecular biochemistry; organometallic and bioorganic chemistry; principles of quantum chemistry; equilibrium thermodynamics. Electives: introduction to electrochemistry or elimination reactions, electrophilic addition to unsaturated substrates or ecotoxicology and pollution management.
S-5	Molecular dynamics; modeling; atomic and molecular electronic spectroscopy. Electives: mechanism of drug action, structure-activity relationship or chemistry and physics in the natural environment, polymer cycles and polymer chemistry or biosynthesis of natural products or industrial processing unit operation or advanced organic chemistry, orbitals and frontier orbitals or colloidal chemistry or statistical thermodynamics.
S-6 S-7	Ethics and professional conduct. Electives: hazardous materials or waste chemistry or strategies in organic synthesis or modern reagents in organic chemistry or surface chemistry or biogeochemical cycles or physical, chemical and biological treatment processes for wastewater.

## ORGANIZATION OF STUDY (S) AND WORK TERM (W)

1st year			2nd year			3rd year			4th year			5th year
FALL	WIN	SUM	FALL	WIN	SUM	FALL	WIN	SUM	FALL	WIN	SUM	FALL
S-1	S-2	W-1	S-3	W-2	S-4	W-3	S-5	W-4	S-6			
	S-1		S-2	S-3	W-1	S-4	W-2	S-5	W-3	S-6	W-4	S-7