Chemistry – Higher Level

IB Diploma Chemistry HL is a two-year course that allows the student to continue the study of chemistry. Typically, chemistry is a prerequisite for many courses at Tertiary Education level such as medicine, veterinary science, biological sciences and environmental science since chemical principles underpin both the physical environment and all biological systems. The subject material includes the composition of matter and the physical and energy changes that matter undergoes during chemical reactions and material interactions. Chemistry is an experimental science that combines academic study with the acquisition of practical and investigative skills.

Subject Areas

1. **Stoichiometry** – Mole concept and Avogadro's constant, formulae, equations and solutions
2. **Atomic Theory** - the atom and electron arrangement
3. **Periodicity** – The Periodic Table, physical and chemical properties of elements
4. **Bonding** - ionic, covalent and metallic bonds, intermolecular forces and physical properties.
5. **State of Matter- –** KE of particles, absolute temperature, energy distribution curves, PV=nRT
6. **Energetic –** Hess's Law, bond enthalpies, entropy and thermodynamics.
7. **Kinetics –** rates of reaction and collision theory
8. **Equilibrium** – dynamic equilibrium and positions
9. **Acids and bases** - properties, strong and weak, the pH scale and buffer solutions
10. **Oxidation and reduction** – reactivity and electrolysis
11. **Organic Chemistry** - homologous series, hydrocarbons and other function groups
12. **Atomic theory** – the mass spectrometer and electron configuration of atoms
13. **Periodicity** – electron configuration, trends in the Periodic Table across periods and down rows.
14. **Bonding** – shapes of molecules and ions, hybridization and delocalization of electrons
15. **Energetic** – standard enthalpy changes of reaction and lattice enthalpy
16. **Kinetics** – rate expression, reaction mechanism and activation energy
17. **Equilibrium** – phase equilibrium and the equilibrium law
18. **Acids and bases** – Lewis Theory, Salt hydration, indicators and titrations
19. **Oxidation and reduction** – redox equations and standard electrode potential
20. **Organic Chemistry** – determination of structure, hydrocarbons and alcohols

Options

21. **Medicines and drugs** - pharmaceutical drugs, anesthetics and mind-altering drugs
22. **Human biochemistry** - diet, protein, vitamins, hormones and enzymes

Assessment

Internal	**Assessments**	Interdisciplinary project, a mixture of short or long term investigations (practical and subject specific projects)	24%

This includes completion of 60 hours of Practical Investigations and must include completion of the Group 4 Project. All Group 4 Science students must complete the Group 4 research project in Grade 11 in addition to the required hours of investigative work over the two-year course. Internal Assessment will be based upon the IBO Diploma Assessment criteria for Practical reports in the areas of Planning, Data Collection, Data Processing and Presentation, Conclusion and Evaluation, Manipulative Skills, and Personal Skills. Practical reports completed by students across the two-years course will be assessable.

External	**Paper 1**	1 hr – 40 multiple choice questions on the core	20%
	Paper 2	1 ¼ hrs • One data based question and several short answer questions on the core • Two extended response question on the core • (a choice of four)	36%
	Paper 3	Several short answer questions in each of the two options studied (all compulsory)	20%