

Syllabus outline

	Teaching hours
Core	80
Topic 1: Quantitative chemistry	12.5
1.1 The mole concept and Avogadro's constant	2
1.2 Formulas	3
1.3 Chemical equations	1
1.4 Mass and gaseous volume relationships in chemical reactions	4.5
1.5 Solutions	2
Topic 2: Atomic structure	4
2.1 The atom	1
2.2 The mass spectrometer	1
2.3 Electron arrangement	2
Topic 3: Periodicity	6
3.1 The periodic table	1
3.2 Physical properties	2
3.3 Chemical properties	3
Topic 4: Bonding	12.5
4.1 Ionic bonding	2
4.2 Covalent bonding	6
4.3 Intermolecular forces	2
4.4 Metallic bonding	0.5
4.5 Physical properties	2
Topic 5: Energetics	8
5.1 Exothermic and endothermic reactions	1
5.2 Calculation of enthalpy changes	3
5.3 Hess's law	2
5.4 Bond enthalpies	2
Topic 6: Kinetics	5
6.1 Rates of reaction	2
6.2 Collision theory	3
Topic 7: Equilibrium	5
7.1 Dynamic equilibrium	1
7.2 The position of equilibrium	4

	Teaching hours
Topic 8: Acids and bases	6
8.1 Theories of acids and bases	2
8.2 Properties of acids and bases	1
8.3 Strong and weak acids and bases	2
8.4 The pH scale	1
Topic 9: Oxidation and reduction	7
9.1 Introduction to oxidation and reduction	2
9.2 Redox equations	1
9.3 Reactivity	1
9.4 Voltaic cells	1
9.5 Electrolytic cells	2
Topic 10: Organic chemistry	12
10.1 Introduction	4
10.2 Alkanes	2
10.3 Alkenes	2
10.4 Alcohols	1
10.5 Halogenoalkanes	2
10.6 Reaction pathways	1
Topic 11: Measurement and data processing	2
11.1 Uncertainty and error in measurement	1
11.2 Uncertainties in calculated results	0.5
11.3 Graphical techniques	0.5
AHL	55
Topic 12: Atomic structure	3
12.1 Electron configuration	3
Topic 13: Periodicity	4
13.1 Trends across period 3	2
13.2 First-row d-block elements	2
Topic 14: Bonding	5
14.1 Shapes of molecules and ions	1
14.2 Hybridization	2
14.3 Delocalization of electrons	2
Topic 15: Energetics	8
15.1 Standard enthalpy changes of reaction	1.5
15.2 Born–Haber cycle	2.5
15.3 Entropy	1.5
15.4 Spontaneity	2.5
Topic 16: Kinetics	6
16.1 Rate expression	3
16.2 Reaction mechanism	1
16.3 Activation energy	2

		Teaching hours
Topic 17: Equilibrium		4
17.1	Liquid–vapour equilibrium	2
17.2	The equilibrium law	2
Topic 18: Acids and bases		10
18.1	Calculations involving acids and bases	4
18.2	Buffer solutions	2
18.3	Salt hydrolysis	1
18.4	Acid–base titrations	2
18.5	Indicators	1
Topic 19: Oxidation and reduction		5
19.1	Standard electrode potentials	3
19.2	Electrolysis	2
Topic 20: Organic chemistry		10
20.1	Introduction	1
20.2	Nucleophilic substitution reactions	2
20.3	Elimination reactions	1
20.4	Condensation reactions	2
20.5	Reaction pathways	1
20.6	Stereoisomerism	3

Options SL and HL

Students at SL study the core of these options and students at HL study the whole option (that is, the core and the extension material).

Option A: Modern analytical chemistry		15/22
Core (SL and HL)		15
A1	Analytical techniques	1
A2	Principles of spectroscopy	2
A3	Infrared (IR) spectroscopy	3
A4	Mass spectrometry	2
A5	Nuclear magnetic resonance (NMR) spectroscopy	2
A6	Atomic absorption (AA) spectroscopy	3
A7	Chromatography	2
Extension (HL only)		7
A8	Visible and ultraviolet (UV-Vis) spectroscopy	3
A9	Nuclear magnetic resonance (NMR) spectroscopy	2
A10	Chromatography	2
Option B: Human biochemistry		15/22
Core (SL and HL)		15
B1	Energy	0.5
B2	Proteins	3
B3	Carbohydrates	3
B4	Lipids	3.5

	Teaching hours
B5 Micronutrients and macronutrients	2
B6 Hormones	3
Extension (HL only)	7
B7 Enzymes	3
B8 Nucleic acids	3
B9 Respiration	1
 Option C: Chemistry in industry and technology	 15/22
Core (SL and HL)	15
C1 Iron, steel and aluminium	3.5
C2 The oil industry	2
C3 Addition polymers	2
C4 Catalysts	1.5
C5 Fuel cells and rechargeable batteries	2
C6 Liquid crystals	2
C7 Nanotechnology	2
Extension (HL only)	7
C8 Condensation polymers	1
C9 Mechanisms in the organic chemicals industry	1
C10 Silicon and photovoltaic cells	1
C11 Liquid crystals	2
C12 The chlor-alkali industry	2
 Option D: Medicines and drugs	 15/22
Core (SL and HL)	15
D1 Pharmaceutical products	2
D2 Antacids	1
D3 Analgesics	3
D4 Depressants	3
D5 Stimulants	2.5
D6 Antibacterials	2
D7 Antivirals	1.5
Extension (HL only)	7
D8 Drug action	2.5
D9 Drug design	2.5
D10 Mind-altering drugs	2
 Option E: Environmental chemistry	 15/22
Core (SL and HL)	15
E1 Air pollution	2
E2 Acid deposition	1.5
E3 Greenhouse effect	1.5
E4 Ozone depletion	1.5
E5 Dissolved oxygen in water	1.5
E6 Water treatment	2.5
E7 Soil	2.5
E8 Waste	2

	Teaching hours
Extension (HL only)	7
E9 Ozone depletion	1
E10 Smog	2
E11 Acid deposition	1
E12 Water and soil	3
 Option F: Food chemistry	 15/22
Core (SL and HL)	15
F1 Food groups	2
F2 Fats and oils	3
F3 Shelf life	4
F4 Colour	3
F5 Genetically modified foods	1
F6 Texture	2
Extension (HL only)	7
F7 Oxidative rancidity (auto-oxidation)	1
F8 Antioxidants	1
F9 Stereochemistry in food	2
F10 Chemical structure and colour	3
 Option G: Further organic chemistry	 15/22
Core (SL and HL)	15
G1 Electrophilic addition reactions	3
G2 Nucleophilic addition reactions	2
G3 Elimination reactions	1
G4 Addition–elimination reactions	1
G5 Arenes	2.5
G6 Organometallic chemistry	2.5
G7 Reaction pathways	1
G8 Acid–base reactions	2
Extension (HL only)	7
G9 Addition–elimination reactions	2
G10 Electrophilic substitution reactions	4
G11 Reaction pathways	1