

Syllabus Outline for Chemistry

Core [80h]			Teaching hours
Topic	1	Quantitative Chemistry	[13]
Sub-topics	1.1	Mole Concept and Avogadro's Constant	2
	1.2	Formulas	3
	1.3	Chemical Equations	1
	1.4	Mass and gas volume relationships in chemical reactions	5
	1.5	Solutions	2
Topic	2	Atomic Theory	[4]
Sub-topics	2.1	The Nuclear Atom	1
	2.2	Physical Properties	1
	2.3	Chemical Properties	2
Topic	3	Periodicity	[6]
Sub-topics	3.1	The Periodic Table	1
	3.2	Physical Properties	2
	3.3	Chemical Properties	3
Topic	4	Bonding	[12.5]
Sub-topics	4.1	Ionic Bond	2
	4.2	Covalent Bond	6.5
	4.3	Intermolecular Forces	1.5
	4.4	Metallic Bond	0.5
	4.5	Physical Properties	2
Topic	5	Energetics	[8]
Sub-topics	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]
Sub-topics	6.1	Rates of Reaction	2
	6.2	Collision Theory	3
Topic	7	Equilibrium	[5]
Sub-topics	7.1	Dynamic Equilibrium	1
	7.2	The Position of Equilibrium	4

Topic	8	Acids and Bases	[5]
Sub-topics	8.1	Theories of Acids and Bases	2
	8.2	Properties of Acids and Bases	1
	8.3	Strong and Weak Acids and Bases	1
	8.4	The pH Scale	1.5
Topic	9	Oxidation and Reduction	[7]
Sub-topics	9.1	Oxidation and Reduction	2
	9.2	Redox Equations	1
	9.2	Reactivity	1
	9.3	Voltaic Cells	1
	9.4	Electrolysis	2
Topic	10	Organic Chemistry	[12]
Sub-topics	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]
Sub-topics	11.1	Uncertainty and Error in Experimental Measurement	1
	11.2	Uncertainties in Calculated Results	0.5
	11.3	Graphical Techniques	0.5

Additional Higher Level [55h]

Topic	12	Atomic Theory	[3]
Sub-topics	12.1	Electronic Configuration of Atoms	3
Topic	13	Periodicity	[4]
Sub-topics	13.1	Periodic Trends Na→ Ar (third period)	2
	13.2	d-block Elements (first row)	2
Topic	14	Bonding	[5]
Sub-topics	14.1	Shapes of Molecules and Ions	1
	14.2	Hybridization	2
	14.3	Delocalization of π electrons	2
Topic	15	Energetic	[8]
Sub-topics	15.1	Standard Enthalpy Changes of Reaction	2
	15.2	Lattice Enthalpy	2.5
	15.3	Entropy	1.5
	15.4	Spontaneity of Reaction	2
Topic	16	Kinetics	[6]
Sub-topics	16.1	Rate Expression	3
	16.2	Reaction Mechanism	1
	16.3	Activation Energy	2
Topic	17	Equilibrium	[4]
Sub-topics	17.1	Liquid-Vapour Equilibrium	2
	17.2	The Equilibrium Law	2
Topic	18	Acids and Bases	[9]
Sub-topics	18.1	Calculations involving Acids and Bases	3.5
	18.2	Buffer Solutions	1.5
	18.3	Salt Hydrolysis	1
	18.4	Acid-Base Titration	2
	18.5	Indicators	1
Topic	19	Oxidation and Reduction	[5]
Sub-topics	19.1	Standard Electrode Potentials	3
	19.2	Electrolysis	2
Topic	20	Organic Chemistry	[11]
Sub-topics	20.1	Introduction	2
	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/HL

NB: Standard level students study the core of these options and higher level student study the whole option (i.e. the core and the extension material)

Option A	Analytical Chemistry	Teaching Hours
Sub-topics	<u>Core (SL + HL)</u>	[15]
	A.1 Analytical Techniques	1
	A.2 Principles of Spectroscopy	2
	A.3 Infrared Spectroscopy	3
	A.4 Mass Spectrometry	2
	A.5 Nuclear Magnetic Resonance Spectroscopy	2
	A.6 Atomic Absorption Spectroscopy	3
	A.7 Chromatography	2
	<u>Extension (HL only)</u>	[7]
	A.8 Visible and Ultraviolet Spectroscopy	3
	A.9 Nuclear Magnetic Resonance Spectroscopy	2
	A.10 Chromatography	2
Option B	Human Biochemistry	Teaching Hours
Sub-topics	<u>Core (SL + HL)</u>	[15]
	B.1 Energy	1
	B.2 Proteins	3
	B.3 Carbohydrates	3
	B.4 Lipids	2
	B.5 Vitamins and Minerals	2
	B.6 Water	2
	B.7 Hormones	2
	<u>Extension (HL only)</u>	[7]
	B.8 Enzymes	2.3
	B.9 Nucleic Acids	3
	B.10 Electrolytes	1.5
Option C	Chemistry in Industry and Technology	Teaching Hours
Sub-topics	<u>Core (SL + HL)</u>	[15]
	C.1 Iron, Steel and Aluminum	3.5
	C.2 The Oil Industry	2
	C.3 Addition Polymers	2
	C.4 Catalysts	1.5
	C.5 Fuel Cells and Rechargeable Batteries	2
	C.6 Liquid Crystals	2
	C.7 Nanotechnology	2

	<u>Extension (HL only)</u>	[7]
	C.8 Condensations Polymers	2
	C.9 Mechanisms in the Organic Chemicals Industry	1
	C.10 Silicon and Photovoltaic Cells	2
	C.11 Liquid Crystals	2
Option D	Medicines and Drugs	Teaching Hours
Sub-topics	<u>Core (SL + HL)</u>	[15]
	D.1 Pharmaceutical Products	2
	D.2 Antacids	1
	D.3 Analgesics	3
	D.4 Depressants	3
	D.5 Stimulants	2.5
	D.6 Antibacterials	2
	D.7 Antivirals	1.5
	<u>Extension (HL only)</u>	[7]
	D.8 Drug Action	2.5
	D.9 Drug Design	2.5
	D.10 Mind-Altering Drugs	2
Option E	Environmental Chemistry	Teaching Hours
Sub-topics	<u>Core (SL + HL)</u>	[19]
	E.1 Air	4
	E.2 Water	4
	E.3 Soil	4
	E.4 Waste	3
	<u>Extension (HL only)</u>	[7]
	E.7 Air	2
	E.8 Water and Soil	3
	E.9 Recycling	2
Option F	Food Chemistry	Teaching Hours
Sub-topics	<u>Core (SL + HL)</u>	[15]
	F.1 Food Groups	2
	F.2 Fats and Oils	3
	F.3 Shelf Life of Foods	4
	F.4 Colour	3
	F.5 Genetically Modified Foods	1
	F.6 Texture	2
		[7]

<u>Extension (HL only)</u>		
F.7	Oxidative Rancidity	1
F.8	Antioxidants	1
F.9	Stereochemistry in Foods	2
F.10	Chemical Structure and Colour	3

Option G Further Organic Chemistry Teaching Hours

Sub-topics	<u>Core (SL + HL)</u>	[15]
	G.1 Electrophilic Addition Reactions	2
	G.2 Nucleophilic Addition Reactions	2
	G.3 Elimination Reactions	2
	G.4 Addition-Elimination Reactions	2
	G.5 Organometallic Compounds	2
	G.6 Reaction Pathways	2
	G.7 Acid-Base Reactions	2
	G.8 Introduction to Arenes	1
	<u>Extension (HL only)</u>	[7]
	G.9 Arenes	2
	G.10 Electrophilic Addition	5