

Subject: Chemistry**Qualification: A level****Course overview**

Students will study contemporary Chemistry, covering the following mandatory units: Development of Practical skills; Foundations in chemistry; Periodic table and energy; Core organic chemistry; Physical chemistry and transition elements and Organic chemistry and analysis.

How is the course assessed?

Grade A*-E awarded. The mandatory units are externally assessed by three examinations. The first two exams equate to 37% each with the final exam worth 26%. A "Practical endorsement in Chemistry" is assessed internally but is reported separately from the A Level Grade.

Where can A level chemistry take you?

Completion of this qualification will give between 16 and 56 UCAS points to gain entry onto a degree course or entry into the workplace. Chemistry can lead to further study and including careers in medicine, dentistry, pharmacy and chemical science.

Case Study

Year Group and Term	Subject Knowledge	Assessment	Curriculum/CIAG Links
Year 12 Term 1	Module 2: Atoms, ions, and compounds: Students reinforce and deepen their understanding of atomic structure and isotopes. Chemical formulae and equations: They then study the idea of "amounts of	1 x required practical 2 x mid-module mini assessment All assessments will be made of past exam questions to challenge students and expose	Links to GCSE content Provides foundations of knowledge for the next two years.

	<p>substance” involving the mole and calculations of reacting quantities.</p> <p>Acids and Redox: The next section covers the concept of redox (reduction and oxidation) and then acids and bases with titrations.</p> <p>Electrons and Bonding: This section deals with electron structure and its link to the different types of chemical bonding.</p>	<p>them to the level of questioning expected of an A level student.</p>	
Year 12 Term 2	<p>Shapes of Molecules: Once the students have a secure understanding of bonding, we use this to work on molecular shapes and intermolecular bonding.</p> <p>Module 3: This begins with an in-depth look at the periodic table and trends across each period. Then, we look into groups two and seven.</p>	<p>1 x tracking point assessment 1 x end of module assessment 2 x required practicals</p>	<p>Links to history regarding the development of the periodic table.</p>
Year 12 Term 3	<p>Continuing Module 3: Heats of reaction (enthalpy), and how to calculate bond energies, including Hess’s law and enthalpy cycles.</p> <p>Next up is reaction rates and equilibrium, including catalysis, the Boltzmann distribution, Le Chatelier’s principle and the equilibrium constant.</p>	<p>2 x required practical 1 x mid-module mini assessment 1 x end of module assessment</p>	<p>Lab skills for careers – data gathering and analysis.</p>
Year 12 Term 4	<p>Module 4: Organic chemistry. Here, we start with nomenclature (naming organic compounds) then onto isomers and</p>	<p>1x mid-module mini assessment 1 x tracking point assessment 2 x required practicals</p>	<p>Lab skills for careers – Use of specialist equipment and the requirement to meet health and</p>

	mechanisms. Then, we cover alkanes and alkenes and their reactions (electrophilic addition and polymerisation), alcohols with their properties and reactions, then the same with haloalkanes.		safety standards, controlling variables, statistical data gathering and analysis. Colorimetry for monitoring rate of reaction.
Year 12 Term 5	Continuing Module 4: Synthetic routes including advanced practical techniques and spectroscopy, including mass spectrometry and infrared spectroscopy.	1 x required practical 1 x mid-module mini assessment 1 x end of module assessment	Lab skills for careers – Use of specialist equipment and the requirement to meet health and safety standards.
Year 12 Term 6	Start the “A2” part of the course. Module 5 (Physical chemistry and transition elements). Starting with rates of reaction including rate constant calculation and graphs. Then, equilibrium with the equilibrium constant and controlling the position of the equilibrium.	1 x end of year assessment HOLIDAY HOMEWORK – reinforcement of the skills learned in Modules	Careers skills – Chemical engineering relating to maximising yield for environmental sustainability and economic success. Cognitive and problem-solving skills: use critical thinking, approach non-routine problems to determine reaction mechanisms from rates data.
Year 13 Term 1	Continuing module 5: Acids, bases and pH covering the pH of weak acids and the acid dissociation constant. Then, buffers and how buffers function in the body. Next, Enthalpy and entropy: Enthalpy changes in solution, lattice enthalpy and Gibbs free energy.	3 x required practical 1 x mid-module mini assessment	Lab skills for careers – Use of specialist equipment (burettes, pipettes) and digital pH probes. Careers / wider curriculum skills – role of buffers in the body (link to biology and medicine).
Year 13 Term 2	This term, Redox (A2 version) and electrode potentials with a study of storage and fuel cells. Final part of module 5 is a close look	2 x required practical 1 x mid module exam 1 x PPE exam	Wider skills and relevance to society – fuel cells and storage

	<p>at the transition elements with ligand substitution and the formation and shapes of complex ions.</p> <p>Module 6: Organic chemistry: Introduction of benzene, phenol and their electrophilic substitution reactions.</p>		<p>cells are currently a key area of ongoing development. The high level of precision for the practical work here is as close as we get to that in an industrial / higher education setting.</p>
Year 13 Term 3	<p>Module 6 continued: The reactions and properties of carbonyl compounds including carboxylic acids then amines, amino acids and condensation polymers. Chromatography and functional group analysis then C-13NMR (nuclear magnetic resonance).</p>	<p>2 x required practical 1 x mid-module mini assessment</p>	<p>Link to materials science and analytical thinking skills. Cognitive and problem-solving skills: use critical thinking, approach non-routine problems applying expert and creative solutions, use systems and technological data such as from NMR and IR machines.</p>
Year 13 Term 4	<p>Complete Module 6: Proton NMR then combined techniques with practice questions.</p>	<p>2 x required practical 1 x mid-module mini assessment 1 x PPE exam</p>	<p>Analytic skills are challenged and developed in these practice questions. The ability to infer structures and draw conclusion is put to the test.</p>
Year 13 Term 5	<p>Revision and exam preparation.</p>		<p>Within each module, students must demonstrate evidence that they have developed the required practical skills (this is module 1 but runs through the course). This is not graded but</p>

			must be completed to achieve a grade.
Year 13 Term 6	N/A		

For further information on this course please contact: Mr R Lyons	<u>Enter e-mail and job title</u> lyons@universityofkentacademiustrust.org.uk
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