Academic INSIGHTS

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Chemistry



AGES AND LOCATIONS

Ages 16-18: Cambridge, Oxford

Students are taught in separate age groups, with content and pace tailored to each. Small classes, averaging 7 students.

COURSE INTRODUCTION

University-level chemistry, covering atomic structure, bonding, organic reaction mechanisms, and green chemistry.

You'll learn to explain bonding and molecular shape, draw reaction mechanisms, and evaluate chemistry's role in sustainability.

You'll leave with a completed personal project and a personalised tutor evaluation to draw on in university applications.



EXAMPLE TUTOR

Sumedh K

PhD candidate, Department of Materials Science and Metallurgy, University of Cambridge

Sumedh's doctoral research investigates hydrogel-based wound dressings, focusing on deposition kinetics, mechanical properties, and cell response. He supervises Cambridge undergraduates in crystallography, solid-state physics, and polymer chemistry.

Chemistry sample syllabus

Academic INSIGHTS

WEEK ONE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
AM	**Inside the atom** Trace the story of the atom from early models to the quantum mechanical picture.	**The periodic table explained** Understand why the table takes the shape it does and how periodic trends emerge.	**Ionic, covalent, and metallic bonding** Compare the three bonding types and what each predicts about properties.	**Molecular shapes and properties** Predict molecular shapes using valence shell electron pair repulsion (VSEPR) theory and link structure to physical properties.	**Functional groups** Learn to recognise the groups that determine how organic molecules react.
PM	**Orbitals and quantum numbers** Use interactive simulations to visualise orbitals and what they tell us.	**Identifying elements from their spectra** Identify mystery elements from real emission spectra and explain the patterns they reveal.	**Molecular orbital theory** Go beyond school-level models to ask what a covalent bond actually is.	**1:1 tutorial** Talk to your tutor about the areas of chemistry that interest you most, and get suggestions for reading and resources to take them further.	**Isomers and structure** Explore how isomers are constructed and named, and how structure changes chemical behaviour.
		Creativity masterclass Explore divergent, convergent, and lateral thinking, then use SCAMPER to generate and pitch original ideas.		**Personal project supervision** Choose a topic for your personal project, plan your research, and start shaping your presentation.	

WEEK TWO

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
AM	**Reactions of alkanes and alkenes** Work through the characteristic reactions of hydrocarbons.	**Principles of green chemistry** Learn how atom economy and careful design reduce hazardous substances and waste.	**Capturing greenhouse gases** Evaluate real research into carbon capture and the chemistry that underpins it.	**Chemistry and climate change** Consider how chemistry can help tackle real-world environmental challenges.	**Personal project presentations** Present your chemistry personal project to your tutor and peers.
PM	**Carbonyl chemistry** Examine how the C=O group behaves and why it is central to organic synthesis.	**Reaction mechanisms** Use curly-arrow notation to track how electron-rich species attack electron-poor centres.	**Sustainable technologies debate** Weigh the trade-offs of biofuels and electric vehicle batteries in a structured debate.	**1:1 tutorial** Get feedback on your progress, and talk through your academic ambitions and the university courses and careers chemistry can lead to.	**Personal project presentations (continued)** Respond to questions and discuss your peers' presentations.
	Critical thinking masterclass Examine the attention economy, echo chambers, logical fallacies, and cognitive bias, then debate a live issue.	**Guest speaker evening** Learn from an inspirational speaker from fields such as broadcasting, writing, philosophy, and sport, then question and debate.	**Personal project supervision** Finalise your research and slides and rehearse your presentation ready for Friday.		**Graduation ceremony** Certificates, speeches, and celebration.

Please note: this is an example syllabus and is subject to change.
Not shown: full evening and weekend social and cultural timetable.

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