

Chemistry

(ATAR)

Pre-requisite: a 'B' grade or better in Year 10 Mathematics is highly recommended
Or a 'C' grade in Year 10A Mathematics is highly recommended
and a 'B' grade or better in Year 10 Science is highly recommended

The Chemistry ATAR course equips students with the knowledge, understanding and opportunity to investigate properties and reactions of materials. Theories and models are used to describe, explain and make predictions about chemical systems, structures and properties.

Students recognise hazards and make informed, balanced decisions about chemical use and sustainable resource management. Investigations and laboratory activities develop an appreciation of the need for precision, critical analysis and informed decision making.

This course prepares students to be responsible and efficient users of specialised chemical products and processes at home or in the workplace. It also enables students to relate chemistry to other sciences, including biology, geology, medicine, molecular biology and agriculture, and prepares them for further study in the sciences.

Course Structure

Year 11

Unit 1 - Chemical fundamentals: structure, properties and reactions

- In this unit, students relate matter and energy in chemical reactions as they consider the breaking and reforming of bonds as new substances are produced. Students can use materials that they encounter in their lives as a context for investigating the relationships between structure and properties.
- Through the investigation of appropriate contexts, students explore how evidence from multiple disciplines and individuals have contributed to developing understanding of atomic structure and chemical bonding.
- Students use science inquiry skills to develop their understanding of patterns in the properties and composition of materials.

Unit 2 - Molecular interactions and reactions

- Students develop their understanding of the physical and chemical properties of materials, including gases, water and aqueous solutions, acids and bases.
- Students explore the characteristic properties of water that make it essential for physical, chemical and biological processes on Earth, including the properties of aqueous solutions.
- Students learn how rates of reaction can be measured and altered to meet particular needs, and use models of energy transfer and the structure of matter to explain and predict changes to rates of reaction.
- Students use a range of practical and research inquiry skills to investigate the behaviour of gases, and use the Kinetic Theory to predict the effects of changing temperature, volume and pressure in gaseous systems.

Year 12

Unit 3 - Equilibrium, acids and bases, and redox reactions

- In this unit, students investigate acid-base equilibrium systems and their applications. They use contemporary models to explain the nature of acids and bases, and their properties and uses.
- Students investigate the principles of oxidation and reduction reactions and the production of electricity from electrochemical cells.
- Through the investigation of appropriate contexts, students explore the ways in which models and theories related to acid-base and redox reactions, and their applications, have developed over time.
- Students use science inquiry skills to investigate the principles of dynamic chemical equilibrium and how these can be applied to chemical processes and systems. They investigate a range of electrochemical cells, including the choice of materials used and the voltage produced by these cells.
- Students use the pH scale to assist in making judgements and predictions about the extent of dissociation of acids and bases and about the concentrations of ions in an aqueous solution.

Unit 4 – Organic chemistry and chemical synthesis

- This unit focuses on organic chemistry and the processes of chemical synthesis by which useful substances are produced for the benefit of society.
- Students investigate the relationship between the structure, properties and chemical reactions of different organic functional groups and the vast diversity of organic compounds.
- Students use science inquiry skills to investigate the principles and application of chemical structure in organic chemistry, and of chemical synthesis processes. They make predictions based on knowledge of types of chemical reactions, and investigate chemical reactions qualitatively and quantitatively.