

# OREL VINE SCHOOL

## Course Outline

### Cambridge AS Level

#### CHEMISTRY

| <i>Term I</i>   |   | <i>Term II</i>                          |   |
|---|---|---|---|
| <i>Topic/Subtopic</i>                                   | <i>Contents</i>   | <i>Topic/Subtopic</i>                   | <i>Contents/Objectives</i>  |
| <i>Atomic structure<br/>(4 hours)</i>                   | <ul style="list-style-type: none"><li>• Particles in the atom and atomic radius</li><li>• Isotopes</li><li>• Electrons, energy levels and atomic orbitals</li><li>• Ionisation energy</li></ul>   | Group 2<br><i>(7 hours)</i>             | <ul style="list-style-type: none"><li>• Similarities and trends in the properties of the Group 2 metals, magnesium to barium, and their compounds</li></ul>   |
| <i>Atoms, molecules and stoichiometry<br/>(8 hours)</i> | <ul style="list-style-type: none"><li>• Relative masses of atoms and molecules</li><li>• The mole and the Avogadro constant</li><li>• Formulae</li><li>• Reacting masses and volumes (of solutions and gases)</li></ul>   | Group 17<br><i>(10 hours)</i>           | <ul style="list-style-type: none"><li>• Physical properties of the Group 17 elements</li><li>• The chemical properties of the halogen elements and the hydrogen halides</li><li>• Some reactions of the halide ions</li><li>• The reactions of chlorine</li></ul> |
| <i>Chemical bonding<br/>(8 hours)</i>                   | <ul style="list-style-type: none"><li>• Electronegativity and bonding</li><li>• Ionic bonding</li><li>• Metallic bonding</li><li>• Covalent bonding and coordinate (dative covalent) bonding</li><li>• Shapes of molecules</li><li>• Intermolecular forces, electronegativity and bond properties</li></ul> | Nitrogen and sulfur<br><i>(3 hours)</i> | <ul style="list-style-type: none"><li>• Nitrogen and sulfur</li></ul>   |

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|   | <ul style="list-style-type: none"> <li>• Dot-and-cross diagrams</li> </ul>   |   |   |
| <p><i>States of matter</i><br/><b>(4 hours)</b></p>                         | <ul style="list-style-type: none"> <li>• The gaseous state: ideal and real gases and <math>pV = nRT</math></li> <li>• Bonding and structure</li> </ul>   | <p>An introduction to AS Level organic chemistry<br/><b>(2 hours)</b></p> | <ul style="list-style-type: none"> <li>• Formulae, functional groups and the naming of organic compounds</li> <li>• Characteristic organic reactions</li> <li>• Shapes of organic molecules; <math>\sigma</math> and <math>\pi</math> bonds</li> <li>• Isomerism: structural and stereoisomerism</li> </ul> |
| <p><i>Chemical energetics</i><br/><b>(4 hours)</b></p>                      | <ul style="list-style-type: none"> <li>• Enthalpy change, <math>\Delta H</math></li> <li>• Hess's Law</li> </ul>   | <p>Hydrocarbons<br/><b>(2 hours)</b></p>                                  | <ul style="list-style-type: none"> <li>• Alkanes</li> <li>• Alkenes</li> </ul>  |
| <p><i>Electrochemistry</i><br/><b>(4 hours)</b></p>                         | <ul style="list-style-type: none"> <li>• Redox processes: electron transfer and changes in oxidation number (oxidation state)</li> </ul>   | <p>Halogen compounds<br/><b>(2 hours)</b></p>                             | <ul style="list-style-type: none"> <li>• Halogenoalkanes</li> </ul>   |
| <p><i>Equilibria</i><br/><b>(3 hours)</b></p>                               | <ul style="list-style-type: none"> <li>• Chemical equilibria: reversible reactions, dynamic equilibrium</li> <li>• Brønsted–Lowry theory of acids and bases</li> </ul>   | <p>Hydroxy compounds &amp; Carbonyl compounds<br/><b>(3 hours)</b></p>    | <ul style="list-style-type: none"> <li>• Alcohols</li> <li>• Aldehydes and ketones</li> </ul>   |
| <p><i>Reaction kinetics</i><br/><b>(4 hours)</b></p>                        | <ul style="list-style-type: none"> <li>• Rate of reaction</li> <li>• Effect of temperature on reaction rates and the concept of activation energy</li> <li>• Homogeneous and heterogeneous catalysts</li> </ul>                                | <p>Carboxylic acids and derivatives<br/><b>(6 hours)</b></p>              | <ul style="list-style-type: none"> <li>• Carboxylic acids</li> <li>• Esters</li> <li>• Primary amines</li> <li>• Nitriles and hydroxynitriles</li> </ul>  |
| <p><i>The Periodic Table: chemical periodicity</i><br/><b>(4 hours)</b></p> | <ul style="list-style-type: none"> <li>• Periodicity of physical properties of the elements in Period 3</li> <li>• Periodicity of chemical properties of the elements in Period 3</li> <li>• Chemical periodicity of other elements</li> </ul> | <p>Polymerisation &amp; Organic synthesis<br/><b>(5 hours)</b></p>        | <ul style="list-style-type: none"> <li>• Addition polymerisation</li> <li>• Organic synthesis</li> <li>• Infrared spectroscopy</li> <li>• Mass spectrometry</li> </ul>  |

## **Resources**

- Cambridge International AS & A Level Chemistry course book by Lawrie Ryan and Roger Norris
- Cambridge AS & A Level Chemistry past papers
- Ezy Education e-learning platform

## **Methodology**

- Discovery method
- Experimentation
- Field study
- Integration of Information technology (IT)
- Research work
- Use of primary and secondary data from various sources

## **Mode of assessment**

- Daily exercises from the coursebook
- End of month tests
- End of unit tests set from Cambridge AS & A Level Chemistry past papers
- Mid - term & end of term assessments
- Quizzes and assignments on the LMS
- Weekly homework assignments
- Ezy education E- learning platform.