
CERTIFICATE IV IN ADULT TERTIARY PREPARATION (10397NAT)

FOUR WEEK INTENSIVE CLASSES - 19 NOVEMBER TO 14 DECEMBER

CHEMISTRY SPECIALISATION

The Chemistry Specialisation applies to those who require foundation Chemistry knowledge and skills for entrance to tertiary study in a relevant discipline or field.

There are three units of study within the Chemistry Specialisation.

In Unit 1: ATPCHE401A students will learn to demonstrate the practical and theoretical application of introductory Chemistry. This unit will teach students to operate safely in a laboratory environment and to solve Chemistry problems by applying theory and skills relating to Chemistry fundamentals, bonding, electron configuration and the Periodic Table. Knowledge to be gained in this unit:

- History of atomic theory to Bohr

- Fundamental knowledge of matter including elements, compounds, mixtures and their different phases

- Avogadro's number, the mole, molar mass and molar volume

- Symbols of elements and formulae of compounds, including molecular and empirical

- Balanced chemical equations and stoichiometry

- Electron configuration of elements

- Arrangements and trends in the Periodic Table

- Types of bonds including ionic, metallic and covalent and their properties

- Molecular shapes and valence structures

- Bond polarity and intermolecular forces including dispersion, dipole-dipole and hydrogen bonding

- Scientific language conventions used in a Chemistry context (such as symbols, terms and definitions)

- Knowledge of hazards associated with the substances and equipment used in laboratory work and risk mitigation strategies

- Strategies to assess the reliability of data and to account for errors in data

The Performance Criteria for ATPCHE401A describes the required performance needed to demonstrate achievement of the elements:

1. Conduct laboratory operations	<p>1.1 Select and use laboratory equipment appropriately to conduct laboratory procedures.</p> <p>1.2 Perform laboratory procedures in a manner that demonstrates an understanding of safe laboratory practices and minimizes the risk to self and others.</p> <p>1.3 Follow verbal and written instructions to perform laboratory operations.</p>
2. Collect and use data	<p>2.1 Collect data from primary data sources or secondary data sources.</p> <p>2.2 Use data to perform calculations and chemical equations.</p> <p>2.3 Manipulate data to explain observations and identify trends.</p>
3. Solve chemistry problems	<p>3.1 Assemble relevant data and information into a logical sequence and form a coherent strategy for problem solving.</p> <p>3.2 Select and apply relevant chemistry facts and theory and perform calculations to solve chemistry problems.</p> <p>3.3 Recognise assumptions, discriminate between valid and invalid conclusions and make judgments on the adequacy of data during problem solving.</p>
4. Communicate effectively in a chemistry context	<p>4.1 Convey chemistry ideas and information in a genre/medium which is appropriate to the audience and purpose and using electronic communication tools where appropriate.</p> <p>4.2 Sequence ideas and information logically.</p> <p>4.3 Use scientific language conventions to communicate in a chemistry context.</p>

In Unit 2: ATPCHE402A students will learn to apply theory relating to thermochemistry, kinetics and equilibrium to chemical systems. This unit will teach students to understand and apply principles of chemical reactions using Chemistry theory and skills relating to thermochemistry, kinetics, equilibrium and acid/base theory. Knowledge to be gained in this unit:

Thermochemistry including exothermic and endothermic reactions

Heats of reaction and Hess's Law

Phase changes and energy

Kinetic theory including reaction rate, collision theory and activation energy

Effect of concentration/molarity, temperature, surface area and catalysts on rate of reaction

Chemical equilibrium including equilibrium law, equilibrium constant and Le Chatelier's Principle

Equilibrium and its application to physical systems

Arrhenius and Bronsted-Lowry definitions of acids and bases

Acid/Base strength including K_a/K_b , K_w and pH

Fundamentals of Volumetric Analysis

Scientific language conventions used in Chemistry (such as symbols, terms and definitions)

Knowledge of hazards associated with substances and equipment used in laboratory work and risk mitigation strategies

Strategies to assess the reliability of data and to account for errors in data

The Performance Criteria for ATPCHE402A describes the required performance needed to demonstrate achievement of the elements:

1. Conduct laboratory operations to understand and apply principles of chemical reactions	1.1 Select and use <i>laboratory equipment</i> appropriately to conduct <i>laboratory procedures</i> relating to thermochemistry, kinetics, equilibrium and acid/base theory. 1.2 Perform laboratory procedures in a manner that demonstrates an understanding of <i>safe laboratory practices</i> and minimises the risk to self and others. 1.3 Follow verbal and written instructions to perform laboratory operations including experiments and investigations.
2. Collect and use data	2.1 Collect data relating to thermochemistry, kinetics, equilibrium and acid/base theory from <i>primary data sources</i> and <i>secondary data sources</i> . 2.2 Use data to perform calculations and chemical equations. 2.3 Manipulate data to identify trends and to explain observations and chemical reactions.

In Unit 3: ATPCHE403A students will learn to apply theory to manipulate data and solve problems relating to electrochemistry and organic chemistry. Knowledge to be gained in this unit:

Electron transfer in chemical reactions including oxidation, reduction, oxidizing agents (oxidants) and reducing agents (reductants)

Identification of oxidation and reduction using oxidation numbers

Balanced equations for redox reactions

Electrochemical cells including cell potentials, standard reduction potentials and cell EMF and their application

Electrolysis and its applications

IUPAC nomenclature of saturated and unsaturated organic substances

Introductory functional group chemistry

Reactions of organic substances including addition, substitution and oxidation reactions

Polymerisation reactions

The Performance Criteria for ATPCHE403A describes the required performance needed to demonstrate achievement of the elements:

1. Conduct laboratory operations	<p>1.1 Select and use laboratory equipment appropriately to conduct laboratory procedures relating to electrochemistry and organic chemistry.</p> <p>1.2 Perform laboratory procedures in a manner that demonstrates an understanding of safe laboratory practices and minimizes the risk to self and others.</p> <p>1.3 Follow verbal and written instructions to perform laboratory operations including experiments and investigations.</p>
2. Collect and use data	<p>2.1 Collect data from primary data sources or secondary data sources and secondary data sources.</p> <p>2.2 Use data to perform calculations and chemical equations.</p> <p>2.3 Manipulate data to explain observations and identify trends and chemical reactions.</p>
3. Solve chemistry problems	<p>3.1 Assemble relevant data and information into a logical sequence and form a coherent strategy for problem solving.</p> <p>3.2 Select and apply relevant chemistry facts and theory and perform calculations to solve chemistry problems relating to electrochemistry and organic chemistry.</p> <p>3.3 Recognise assumptions, discriminate between valid and invalid conclusions and make judgments on the adequacy of data during problem solving.</p>
4. Communicate effectively in a chemistry context	<p>4.1 Convey chemistry ideas and information relating to electrochemistry and organic chemistry in a genre/medium which is appropriate to the audience and purpose and using electronic communication tools where appropriate.</p> <p>4.2 Sequence ideas and information logically.</p> <p>4.3 Use scientific language conventions to communicate in a chemistry context.</p>

November Intensive Chemistry Timetable - 2018

Mon	Tue	Wed	Thu	Fri	Sat
19 Nov 8.30am – 1.00pm	20 Nov 8.30am – 1.00pm	21 Nov 8.30am – 1.00pm	22 Nov 8.30am – 1.00pm	23 Nov 8.30am – 1.00pm	24 Nov
26 Nov 8.30am – 1.00pm	27 Nov 8.30am – 1.00pm	28 Nov 8.30am – 1.00pm	29 Nov 8.30am – 1.00pm	30 Nov 8.30am – 1.00pm	1 Dec
3 Dec 8.30am – 1.00pm	4 Dec 8.30am – 1.00pm	5 Dec 8.30am – 1.00pm	6 Dec 8.30am – 1.00pm	7 Dec 8.30am – 1.00pm	8 Dec
10 Dec 8.30am – 1.00pm	11 Dec 8.30am – 1.00pm	12 Dec 8.30am – 1.00pm	13 Dec 8.30am – 1.00pm	14 Dec 8.30am – 1.00pm	