

## APPLY CHEMICAL SCIENCE

**UNIT CODE: ENG/OS/CE/CC/3/6**

### UNIT DESCRIPTION

This unit covers the competencies required to apply inorganic chemistry, organic chemistry, physical chemistry, biochemistry and microbiology.

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>(Bold and italicised terms are elaborated in the Range)</i>
1. Apply inorganic chemistry	1.1 Ionic and covalent bonds are identified and their properties determined 1.2 The <i>periodic table</i> is understood 1.3 Prepare solutions of known concentration 1.4 solutions are standardized 1.5 a material is electroplated 1.6 a crystal is prepared
2. Apply organic chemistry	2.1 <i>Organic compounds</i> are identified 2.2 <i>Properties of organic compounds</i> are determined 2.3 organic compounds are prepared
5. Apply physical chemistry	3.1 Gases are liquified 3.2 Solutions are prepared 3.3 Crystals are made 3.4 Fractional distillation is performed 3.5 Titration is performed 3.6 Chemical reactions are analyzed
6. Apply biochemistry	4.1 Light microscope is used to identify organelles 4.2 <i>Substrates</i> are identified, classified and tested 4.3 Enzymes are identified and tested
7. Apply microbiology	5.1 Microbes are classified 5.2 Microbes are grown 5.3 Microbes are observed and stained and counted 5.4 Fermentation process is performed using microbes 5.5 Microbes are sterilized 5.6 Microbes are safely disposed

### RANGE

<b>Variable</b>	<b>Range</b>
Periodic table include but is not limited to:	<ul style="list-style-type: none"><li>• s- block elements</li><li>• p- block elements</li><li>• d- block elements</li></ul>

Organic compounds	<ul style="list-style-type: none"> <li>• Hydrocarbons</li> <li>• Alkylhalides</li> <li>• Aromatic compounds</li> <li>• Hydroxyl compounds/ alcohol</li> <li>• Carbonyl compounds</li> <li>• Carboxylic acids</li> <li>• Esters</li> <li>• Organo-nitrogen compounds</li> <li>• Polymers</li> </ul>
Properties of organic compounds	<ul style="list-style-type: none"> <li>• Physical properties</li> <li>• Chemical properties</li> </ul>
Substrates	<ul style="list-style-type: none"> <li>• Protein</li> <li>• Carbohydrates</li> <li>• Lipids</li> <li>• Nucleic acids</li> <li>• Vitamins</li> </ul>

## REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

### Required skills

The individual needs to demonstrate the following skills:

- Preparing solutions
- Electroplating
- Standardize solutions
- Crystallizing
- Titration
- Distilling
- Report writing
- Organizing and planning
- Collecting data

### Required knowledge

The individual needs to demonstrate knowledge of:

- Periodic table
- Types of bonds
- Crystallization
- Solutions
- Concentrations
- Organic compounds

- Microbes
- Microscopes
- Gases
- States of matter

## EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and understanding and range.

1. Critical Aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 understood the <i>periodic table</i></li> <li>1.2 Prepared solutions of known concentration</li> <li>1.3 standardized solutions</li> <li>1.4 prepared crystals</li> <li>1.5 used a light microscope</li> <li>1.1 tested substrates</li> <li>1.2 tested enzymes</li> <li>1.3 observed and stained and counted microbes</li> <li>1.4 Performed fermentation process using microbes</li> <li>1.5 Sterilized microbes</li> <li>1.6 Safely disposed microbes</li> </ul>
2. Resource Implications	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> <li>2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place</li> <li>2.2 Laboratory</li> <li>2.3 Relevant reagents</li> <li>2.4 Relevant apparatus</li> </ul>
3. Methods of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> <li>3.1 Practical tests</li> <li>3.3 Observation</li> </ul>
4. Context of Assessment	<p>Competency may be assessed individually in the actual workplace or a simulated work place setting</p>
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>