CONDUCT SCIENTIFIC RESEARCH

UNIT CODE: 0111 551 13A

TVET CDACC UNIT CODE: AGR/OS/AP/CC/07/6/MA

UNIT DESCRIPTION

This unit specifies the competencies required by an Industrial Chemist to conduct scientific research**.** It involves preparing scientific research proposal, carrying out laboratory research, analyzing the laboratory research findings and documenting and disseminating laboratory research findings.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the **key outcomes** which make up workplace function	**PERFORMANCE CRITERIA** These are **assessable statements** which specify the required level of performance for each of the elements
1. Prepare scientific research proposal	1.1 Scientific research problem is identified based on existing research gap 1.2 Research objectives are developed according to research problem 1.3 Research questions are designed based on research objectives 1.4 Scientific research proposal is developed as per standard research procedures
2. Apply scientific research methods	2.1 ***Scientific study design*** is determined in accordance with research problem and research data 2.2 Sample size is determined based on the research methodology 2.3 ***Sampling techniques*** are determined in accordance with scope and research methodology 2.4 Ethical considerations are determined based on research methods utilized 2.5 Research materials are identified based on scope and

	research methodology 2.6 Data is collected in accordance with research methodology
3. Analyze scientific research finding	3.1 ***Data analysis methods*** are identified as per job requirement. 3.2 Data analysis is performed as per work procedure 3.3 Research report is prepared as per work procedure.

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

VARIABLE	**RANGE**
Scientific study design may include but are not limited to:	• Qualitative designs • Quantitative designs
Sampling techniques may include but are no limited to:	• Probability • Non-probability
Data analytical methods may include but are not limited to:	• ANOVA • Measures of central tendency • Measures of dispersal

REQUIRED SKILLS AND KNOWLEDGE

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

Required Knowledge

The individual needs to demonstrate knowledge of:

- Introduction to research
- Problem identification
- Types of research
- Purposes of research
- Basic terms in research
- Problem identification
- Literature review
- Research design

- Data collection and analysis
- Research materials
- Statistics
- Mathematics
- Research proposal
- Research report

Required Skills

The individual needs to demonstrate the following skills:

- Analytical
- Communication
- Computer
- Creativity
- Interpersonal
- Critical thinking
- Data collection
- Decision making
- Dissemination
- Observation
- Problem solving
- Report writing
- Statistical

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified scientific research problem based on existing research gap 1.2 Developed scientific research proposal as per work requirement. 1.3 Determined Scientific study design in accordance with

	research problem and research data 1.4 Collected data in accordance with research methodology 1.5 Applied data analysis techniques as per work requirement Compiled Research report as per work requirement
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place 2.3 Resources relevant to the proposed activity or tasks.
3. Methods of Assessment	Competency may be assessed through: 3.1 Practical Assessment 3.2 Project-Based Assessment 3.3 Portfolio of Evidence 3.4 Third Party Reports 3.5 Written Assessment
4. Context of Assessment	Competency may be assessed in a workplace or simulated workplace
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.