CONDUCT SCIENCE LABORATORY RESEARCH

UNIT CODE: 0588 441 06A
TVET CDACC UNIT CODE: SLT/OS/SL/CC/02/5/MA

UNIT DESCRIPTION

This unit specifies the competencies required to conduct science laboratory research. It involves preparing science laboratory research data collection tools, carrying out science laboratory research data collection and science laboratory research data analysis

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the **key outcomes** which make up workplace function (to be stated in active)	**PERFORMANCE CRITERIA** These are **assessable statements** which specify the required level of performance for each of the elements (to be stated in passive voice) ***Bold and italicized terms are elaborated in the Range***
1. Prepare science laboratory research data collection tools	1.1 ***Data collection method*** is identified as per work requirement 1.2 ***Data collections tools*** are identified as per work requirement 1.3 Data collection tools are designed as per research design 1.4 Data collection tools are pretested as per work requirement
2. Carry out science laboratory research data collection	2.1 Research study location is identified as per work requirement. 2.2 Research Sample size is identified as per work requirement. 2.3 Data collection procedure is carried out as per study design

3. Carry out science laboratory research data analysis	3.1 ***Data organization*** is carried out as per work requirement 3.2 Data analysis tools are identified as per study design. 3.3 Data analysis procedure is carried out as per work requirement 3.4 Research data results are reported as per scientific research methodology
4. Prepare scientific research proposal	4.1 Scientific research problem is identified based on existing research gap 4.2 Research objectives are developed according to research problem 4.3 Research questions are designed based on research objectives ***3.5*** Scientific research proposal is developed as per standard research procedures
5. Apply scientific research methods	5.1 ***Scientific study design*** is determined in accordance with research problem and research data 5.2 Sample size is determined based on the research methodology 5.3 ***Sampling techniques*** are determined in accordance with scope and research methodology 5.4 Ethical considerations are determined based on research methods utilized 5.5 Research materials are identified based on scope and research methodology ***3.6*** Data is collected in accordance with research methodology
6. Analyze scientific research findings	6.1 ***Data analysis methods*** are identified as per job requirement. 6.2 Data analysis is performed as per work procedure ***3.7*** 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

1. Data collection method include but not limited to:	• Interviews • Surveys • Observations • Experiments • Secondary data sources • Direct measurements
2. Data collections tools include but not limited to:	• Questionnaires • Photography and videos • Google forms
3. Data organization include but not limited to:	• Data formatting • Data cleaning • Data coding
4. Conceptual framework includes but nc limited to:	• Analytical tool • A diagram that shows causes and effects of a problem • Diagram that shows relationship between independent and dependent variables
5. Theoretical framework includes but not limited to:	• Structure that can hold or support a theory of a research study. • Introduces and describes the theory • Identification of theories that relate to a research problem 1. Context for explaining a problem
6. Scientific study design includes but not limited to:	• Qualitative designs 1. Quantitative designs
7. Sampling techniques include but not limite to:	• Probability 2. Non-probability

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:

- Computer application
- Scientific research reporting
- First aid
- Communication
- Observation
- Critical thinking
- Problem solving
- Environmental conservation

Required Knowledge

The individual needs to demonstrate knowledge of:

- Laboratory ware and equipment
- Science laboratory safety
- Quantitative and qualitative analysis
- Laboratory safety designs
- Laboratory waste disposal
- Laboratory ethical standards
- Record maintenance
- Computer application
- Laboratory hygiene
- Basic mathematics
- Entrepreneurship

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 data collection method as per work requirement 1.2 Designed data collection tools as per research design 1.3 Identified research sample size as per work requirement. 1.4 Carried out data collection procedure as per study design 1.5 Carried out data analysis procedure as per work requirement 1.6 Identified scientific research problem based on existing research gap 1.7 Developed scientific research proposal as per work requirement. 1.8 Determined Scientific study design in accordance with research problem and research data 1.9 Collected data in accordance with research methodology 1.10Applied 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 Appropriately simulated environment where assessment can take place. 2.2 Access to relevant work environment. 2.3 Resources relevant to the proposed activities or tasks.
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Practical 3.2 Project 3.3 Third party report 3.4 Portfolio of evidence 3.5 Written test 3.6 Oral test
4. Context of Assessment	Competency may be assessed in a work place or simulated workplace
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector and workplace job role is recommended.