



**Australian Government**

# **MSL50109 Diploma of Laboratory Technology**

**Release: 4**

## **MSL50109 Diploma of Laboratory Technology**

### **Modification History**

Release 4 - ISC upgrade

- Correction of data error in core units – MSAENV472B reinstated as per original release.

Release 3 - ISC upgrade

- Correction of wrong MSAENV unit listed in core and elective units in release 2
- Prerequisite listed for HLTPAT419A removed – unit has no prerequisite
- HLTPAT units updated to current versions - equivalent
- Incorrect elective units listed in Group 2 in Release 2

Release 2 - inclusion of new electives for forensic testing

## Description

This qualification covers the skills and knowledge required to apply a range of laboratory technologies to conduct scientific-technical tests and sampling in most industry sectors.

### Job roles/employment outcomes

The Diploma of Laboratory Technology offers broad or specialised technical training in a range of laboratory technologies. Employment outcomes targeted by this qualification include technical officers, laboratory technicians, analysts and similar personnel.

Technical officers conduct a wide range of sampling and testing that requires the application of broad scientific-technical knowledge and skills, with substantial depth in some areas. Although technical officers generally work in a laboratory, they often work closely with personnel in other teams within a section of the workplace.

They may liaise with suppliers to troubleshoot product non-conformance at the direction of laboratory supervisors or managers. They gather information on non-conformance and events that may lead to the modification of workplace procedures. They may also demonstrate methods to others and train them to collect samples and conduct basic tests reliably.

The work of technical officers involves frequent peak periods and interruptions. They:

- work according to established procedures in a structured environment
- collect and prepare samples and communicate sample requirements to other personnel
- conduct a wide range of routine and specialised tests where atypical samples may be involved and the instrumentation used has a wide range of operating variables
- contribute to the modification of standard operating procedures (SOPs) and enterprise methods when necessary
- define and solve problems where alternatives are not obvious and where investigations and trials may be required and the implications of various solutions considered
- work under the direction and supervision of senior technical staff, laboratory or quality managers, or scientific/medical professionals
- generally work as part of a team and may have a role in the planning of schedules and monitoring of resources in their work area.

Examples of the work of technical officers are given below.

- Technical officers who work in a pathology laboratory perform a range of tests on body tissues and fluids to measure quantities such as:
- the amount of biological substances, (for example, cholesterol or creatine)
- biological function (for example, clotting)
- the presence of drugs (for example, heparin or alcohol).

They also prepare cultures, stained tissue sections and thin films to count and classify cells, bacteria and parasites.

They also perform routine calibration and maintenance of instruments.

- A technical officer who works in a major food processing plant conducts a range of tests on the company products to measure:
- the concentration of nutrients and food additives, such as dyes and flavourings

- the concentration of contaminants, such as heavy metals and microbial toxins
- pH, salt, moisture and fat content.

The officer also conducts a range of tests on the packaging material used for the company's products.

### **Application**

This qualification is typically used to prepare new employees or develop the skills of existing workers performing specialised scientific-technical tests and sampling in most industry sectors.

Training programs for this qualification are suitable to be undertaken as part of a formal training contract with an employer under an Australian Traineeship or Apprenticeship arrangement.

## **Pathways Information**

### **Pathways into the qualification**

This qualification may be accessed by direct entry. Credit may be granted towards this qualification by those who have completed the MSL40109 Certificate IV in Laboratory Techniques. Credit for this qualification may include units contained within relevant skill sets.

### **Pathways from the qualification**

Further training pathways from this qualification include MSL60109 Advanced Diploma of Laboratory Operations.

Career paths for senior technicians, technical specialists and laboratory supervisors are becoming increasingly constrained unless technicians undertake university study. With this in mind, particular attention has been given to stating the critical aspects of competency and essential knowledge required for each unit of competency in sufficient detail to maximise articulation and credit transfer arrangements between the vocational education and training (VET) and higher education sectors.

### **Additional qualification advice**

Because specialisation is an industry requirement for the Diploma, Registered Training Organisations (RTOs) may choose to issue a generic:

- Diploma of Laboratory Technology

or, where elective units of competency are packaged to suit a particular industry sector or specialisation, RTOs might issue a:

- Diploma of Laboratory Technology  
(specialising in xxxxxxx)

Industry sector/specialisations could include, but are not limited to:

- biological testing
- biological and environmental testing

- biotechnology
- calibration
- chemical testing
- construction materials testing
- environmental monitoring
- forensic testing
- food testing
- manufacturing testing
- mineral assay
- pathology testing
- scientific glassblowing.

It should be noted that a qualification with a specialisation does not change the title of the qualification, although RTOs may choose to record the specialisation. The AQTF requirements must be complied with and the qualification or Statement of Attainment should clearly specify the units of competency achieved and where appropriate, the specialisation.

## **Licensing/Regulatory Information**

There are no specific licences that relate to this qualification. However, some units in this qualification may have licensing or regulatory requirements. Local regulations should be checked for details.

## **Entry Requirements**

Not applicable.

## Employability Skills Summary

<b>EMPLOYABILITY SKILLS QUALIFICATION SUMMARY</b>	
<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include:</b>
Communication	<ul style="list-style-type: none"> <li>• Communicate appropriately with internal and external customers in order to respond effectively to requests of a specialised technical nature</li> <li>• Write procedures using an unambiguous, logical sequence of instructions that meet statutory and regulatory requirements</li> <li>• Record and store data, perform calculations of scientific quantities and present information in tables and graphs</li> <li>• Report using verbal responses, data entry into laboratory information management system (LIMS) and brief written reports</li> </ul>
Teamwork	<ul style="list-style-type: none"> <li>• Work effectively with team members who may have diverse work styles, cultures and perspectives when reporting problems, hazards and incidents and results or contributing to productivity improvements</li> <li>• Promote cooperation and good relations in the team</li> <li>• Liaise with peers and technical staff from other laboratories</li> </ul>
Problem solving	<ul style="list-style-type: none"> <li>• Modify and revise existing procedures or substitute alternative instruments and measurement standards</li> <li>• Detect potential or actual non-conformances, assess their significance and recommend preventative or corrective actions</li> <li>• Apply specialised technical knowledge to critically analyse and resolve complex problems and non-conformances where solutions are not obvious or readily available</li> </ul>
Initiative and enterprise	<ul style="list-style-type: none"> <li>• Recommend appropriate preventative/corrective actions to improve sampling, testing and/or calibration activities</li> <li>• Identify hazards associated with samples, preparation methods, reagents and equipment and implement enterprise control measures</li> <li>• Research current, alternative methods and equipment</li> <li>• Suggest improvements in productivity and quality</li> </ul>
Planning and organising	<ul style="list-style-type: none"> <li>• Modify work plans to suit changing conditions and priorities</li> <li>• Assemble, organise, check and optimise specified laboratory/ filed equipment and materials</li> <li>• Plan/adjust maintenance schedules in accordance with operational requirements</li> <li>• Plan work sequences to optimise throughput of multiple samples</li> </ul>

**EMPLOYABILITY SKILLS QUALIFICATION SUMMARY**

Self-management	<ul style="list-style-type: none"> <li>• Communicates in an efficient and polite manner, taking into account cultural diversity and disabilities</li> <li>• Follow enterprise procedures which reflect equal opportunity, anti-discrimination and non-harassment legislative requirements</li> <li>• Conduct work based on ethical values and principles and ensure quality and integrity of own work</li> <li>• Review own strengths, weaknesses and work practices for opportunities to continuously improve performance</li> <li>• Maintain security and confidentiality of all client/enterprise data and information</li> <li>• Use appropriate personal protective equipment to ensure personal safety when sampling, processing, transferring or disposing of samples</li> </ul>
Learning	<ul style="list-style-type: none"> <li>• Review feedback from other laboratories to assess acceptance of newly created calibration procedures</li> <li>• Update knowledge and skills and take advantage of skill development opportunities</li> <li>• Coach others in participating in occupational health and safety (OHS) and environmental management issues</li> </ul>
Technology	<ul style="list-style-type: none"> <li>• Create, edit, test and document computer controlled calibration procedures for test and measurement instruments</li> <li>• Select and use computers and software to collect and report information</li> <li>• Select, use and optimise laboratory/filed equipment, such as calibration equipment, autoanalysers, containment facilities and spectrometers</li> </ul>

**Packaging Rules**

To be awarded a Diploma of Laboratory Technology competency must be achieved in a total of **twenty one (21)** units of competency, consisting of:

- **nine (9)** mandatory units of competency from Group 1
- **twelve (12)** elective units of competency from Groups 2 and 3, chosen as described below.

Units listed under **mandatory** are considered essential for all technical officers. The units listed as **electives** may only apply to some personnel according to the size and scope of the particular enterprise and laboratory.

**Note:** Prerequisite units are listed and must be considered in the total number of units.

### Group 1 – Mandatory units

- Select all **nine (9)** units of competency listed below.

Unit code	Unit title	Prerequisites
MSAENV472B	Implement and monitor environmentally sustainable work practices	
MSL913001A	Communicate with other people	
MSL913002A	Plan and conduct laboratory/field work	
MSL915001A	Provide information to customers	
MSL924001A	Process and interpret data	
MSL924002A	Use laboratory application software	
MSL925001A	Analyse data and report results	MSL924001A
MSL934002A	Apply quality system and continuous improvement processes	
MSL944001A	Maintain laboratory/field workplace safety	

### Group 2 – Elective units

- A **minimum of five (5)** units of competency must be selected from Group 2.

Unit code	Unit title	Prerequisites
MSL905001A	Perform non-standard calibrations	MSL904001A
MSL905002A	Create or modify calibration procedures	MSL905001A, MSL904001A
MSL905003A	Create or modify automated calibration procedures	MSL905002A, MSL905001A, MSL904001A



MSL915002A	Schedule laboratory work for a small team	
MSL925002A	Analyse measurements and estimate uncertainties	MSL924001A
MSL935001A	Monitor the quality of test results and data	MSL924001A
MSL935002A	Assist in the maintenance of reference materials	
MSL935003A	Authorise the issue of test results	MSL925001A, MSL924001A
MSL935004A	Maintain instruments and equipment	
MSL955001A	Supervise a robotic sample preparation system	MSL953002A
MSL965001A	Design and manufacture glass apparatus and glass systems	MSL963001A, MSL963002A
MSL965002A	Perform glass coating, grinding and finishing operations	MSL963001A, MSL963002A
MSL965003A	Construct, modify and maintain high vacuum systems	MSL963001A, MSL963002A
MSL975001A	Perform microbiological tests	MSL974006A, MSL973004A, MSL973007A
MSL975002A	Perform haematological tests	MSL974006A, MSL973004A, MSL973007A
MSL975003A	Perform histological tests	MSL974006A, MSL973004A, MSL973007A
MSL975004A	Perform chemical pathology tests	MSL974006A, MSL973004A, MSL973007A
MSL975005A	Conduct sensory analysis	

MSL975006A	Perform immuno-haematological tests	MSL974006A, MSL973004A, MSL973007A
MSL975007A	Supervise sampling, inspections and testing at construction sites	MSL974002A, MSL973012A
MSL975008A	Apply electrophoretic techniques	MSL973002A <b>OR</b> MSL974001A and MSL974003A
MSL975009A	Apply routine chromatographic techniques	MSL974003A <b>OR</b> MSL974004A <b>OR</b> MSL974006A, MSL973004A, and MSL973007A
MSL975010A	Perform fire assay techniques	MSL973011A <b>OR</b> MSL954002A
MSL975011A	Design and supervise complex environmental field surveys	MSL974007A
MSL975012A	Provide input to production trials	MSL974003A <b>OR</b> MSL974004A <b>OR</b> MSL974005A <b>OR</b> MSL974010A
MSL975013A	Perform tissue and cell culture techniques	MSL974006A, MSL973004A, MSL973007A
MSL975014A	Perform molecular biology tests and procedures	MSL974006A, MSL973004A, MSL973007A
MSL975015A	Prepare animal and plant material for display	MSL974006A, MSL973004A, MSL973007A
MSL975016A	Perform complex tests to measure engineering	MSL974012A,

	properties of materials	MSL973001A, MSL973010A
MSL975017A	Perform laboratory-based ecological techniques	MSL974006A, MSL973004A, MSL973007A
MSL975018A	Perform complex tests to measure chemical properties of materials	MSL975009A <b>OR</b> MSL975020A <b>AND</b> MSL974003A <b>OR</b> MSL974004A <b>OR</b> MSL974006A, MSL973004A, and MSL973007A
MSL975019A	Apply complex instrumental techniques	MSL975009A <b>OR</b> MSL975020A <b>AND</b> MSL974003A <b>OR</b> MSL974004A <b>OR</b> MSL974006A, MSL973004A, and MSL973007A
MSL975020A	Apply routine spectrometric techniques	MSL974003A <b>OR</b> MSL974004A <b>OR</b> MSL974006A, MSL973004A, and MSL973007A

MSL975021A	Apply routine electrometric techniques	MSL974003A <b>OR</b> MSL974004A <b>OR</b> MSL974006A, MSL973004A, and MSL973007A
MSL975022A	Perform food analyses	MSL974004A <b>OR</b> MSL974006A, MSL973004A, and MSL973007A
MSL975023A	Supervise geotechnical site investigations	MSL974002A, MSL973012A
MSL975024A	Locate record and collect forensic samples	
MSL975025A	Perform complex laboratory testing of forensic samples	
MSL975026A	Perform physical examination of forensic samples	

### Group 3 – Other elective units

The balance of units, to a **maximum of seven (7)**, may be selected in any combination from:

- units not already chosen from Group 2 above
- a **maximum of four (4)** relevant units from other endorsed Training Packages where those units are aligned at **Diploma** level
- a **maximum of three (3)** units from Group 3A
- a **maximum of five (5)** units from Group 3B
- a **maximum of two (2)** units from Group 3C.

### Group 3A

Unit code	Unit title	Pre-requisites
MSL933001A	Maintain the laboratory/field workplace fit for purpose	

MSL933003A	Apply critical control point requirements	
MSL933004A	Perform calibration checks on equipment and assist with its maintenance	
MSL943001A	Work safely with instruments that emit ionising radiation	
MSL953001A	Receive and prepare samples for testing	
MSL953002A	Operate a robotic sample preparation system	
MSL963001A	Operate basic handblowing equipment	
MSL963002A	Repair glass apparatus using simple glassblowing equipment	MSL963001A
MSL973001A	Perform basic tests	
MSL973002A	Prepare working solutions	
MSL973003A	Prepare culture media	
MSL973004A	Perform aseptic techniques	
MSL973005A	Assist with fieldwork	
MSL973006A	Prepare trial batches for evaluation	
MSL973007A	Perform microscopic examination	
MSL973008A	Perform histological procedures	
MSL973009A	Conduct field-based acceptance tests for construction materials	
MSL973010A	Conduct laboratory-based acceptance tests for construction materials	
MSL973011A	Perform fire pouring techniques	
MSL973012A	Assist with geotechnical site investigations	
HLTPAT317C	Operate effectively within a pathology testing environment	
TAADEL301C	Provide training through instruction and demonstration of work skills	

Government Skills Australia Radiation Safety units where those units are aligned at **Certificate III**

### Group 3B

Unit code	Unit title	Prerequisites
MSL904001A	Perform standard calibrations	
MSL914001A	Prepare practical science classes and demonstrations	
MSL934001A	Contribute to the ongoing development of HACCP plans	
MSL934003A	Maintain and control stocks	
MSL954001A	Obtain representative samples in accordance with sampling plan	
MSL954002A	Prepare mineral samples for analysis	
MSL974001A	Prepare, standardise and use solutions	
MSL974002A	Conduct geotechnical site investigations	MSL973012A
MSL974003A	Perform chemical tests and procedures	
MSL974004A	Perform food tests	
MSL974005A	Perform physical tests	
MSL974006A	Perform biological procedures	MSL973004A, MSL973007A
MSL974007A	Undertake environmental field-based monitoring	
MSL974008A	Capture and manage scientific images	
MSL974009A	Undertake field-based, remote-sensing monitoring	

MSL974010A	Perform mechanical tests	
MSL974011A	Prepare tissue and cell cultures	MSL973004A
MSL974012A	Perform tests to determine the properties of construction materials	MSL9730001A <b>OR</b> MSL973010A
MSL974013A	Monitor performance of structures	MSL973009A
MSAENV472B	Implement and monitor environmentally sustainable work practices	
HLTPAT419C	Perform pathology tests	
<p>Government Skills Australia Radiation Safety units where those units are aligned at <b>Certificate IV</b></p>		

### Group 3C

Unit code	Unit title	Prerequisites
MSL916001A	Develop and maintain laboratory documentation	
MSL916002A	Manage and develop teams	
MSL916003A	Supervise laboratory operations in work/functional area	
MSL916004A	Maintain registration and statutory or legal compliance in work/functional area	
MSL916005A	Manage complex projects	
MSL936001A	Maintain quality system and continuous improvement processes within work/functional area	
MSL936002A	Conduct an internal audit of the quality system	

MSL946001A	Implement and monitor OHS and environmental management systems	
MSL976001A	Classify building sites	MSL975023A <b>OR</b> MSL975007A <b>AND</b> MSL974002A, MSL973012A
MSL976002A	Prepare plans and quality assurance procedures for environmental field activities	MSL975011A, MSL974007A
MSL976003A	Evaluate and select appropriate test methods and/or procedures	
MSL977001A	Contribute to the development of products and applications	MSL976003A
MSL977002A	Troubleshoot equipment and/or production processes	MSL976003A
MSL977003A	Contribute to the validation of test methods	MSL976003A
MSL977004A	Develop or adapt analyses and procedures	MSL976003A
MSL977005A	Integrate data acquisition and interfacing systems	MSL924002A
MSAENV672B	Develop workplace policy and procedures for sustainability	
<p>Government Skills Australia Radiation Safety units where those units are aligned at <b>Advanced Diploma</b> level</p>		