

HIRAC Report

Risk, Health and Safety

Title: Ballarat Tech School Laboratory	Authorized By: Liam Mudge / Damon Minotti
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1. Hazard Management Details – General

This form relates to OHS Procedure – [Hazard Identification, Risk Assessment and Control \(HIRAC\)](#)

School / Work Location:	Ballarat Tech School (Fed College) Building K, SMB
Name of Person(s):	Liam Mudge, Albert Ferguson, Greg D'Cruz
Date Conducted:	09/09/2022
Last Reviewed:	01/09/2021
Next Review Due:	September 2023

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Description of Use:	Summary of Key Risks: (Refer to appropriate subsections)	
<p>The Ballarat Tech School delivers a range of science curriculum projects. Some of these may be hazardous to user's health if safety procedures and lab etiquette are not followed.</p> <p>The laboratory space is rated as a maximum PC1 laboratory for microbiological purposes as specified by AS/NZS 2243.3-2010</p> <p>Experimentation activities include:</p> <ul style="list-style-type: none"> • Chemistry • Microbiology • Experimentation 	<p>ENTANGLEMENT</p> <p>Condition of Equipment</p> <p>IMPACT & CUTTING INJURIES</p> <p>ELECTRICITY</p> <p>ERGONOMICS</p> <p>RADIATION</p> <p>FRICITION</p> <p>NOISE</p> <p>SHEARING</p> <p>VIBRATION</p> <p>SUFFOCATION</p>	<p>SLIPS / TRIPS / FALLS</p> <p>Spills & Clean Up</p> <p>Disposal of chemical/biological agents</p> <p>Experimentation</p> <p>Microbial hazards</p> <p>Storage</p> <p>FIRE & EXPLOSION</p> <p>TEMPERATURE / MOISTURE</p> <p>OTHER</p> <p>Storage and Disposal</p> <p>Contamination or Infection</p>

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Risk Assessment Matrix

Assessing OHS Risks

Risk assessments in matters of Occupational Health and Safety* are based on 2 key factors:

- The severity of any injury/illness resulting from the hazard(s), and
- The likelihood that the injury/illness will actually occur.

**Assessment of risk level based on likely severity and probability of harm*

		LIKELIHOOD			
		Very Unlikely Could happen, but probably never will	Unlikely Could happen, but very rarely	Likely Could happen sometime	Very likely Could happen any time
SEVERITY	Death or permanent disability	MEDIUM	HIGH	EXTREME	EXTREME
	Long-term illness or serious injury	LOW	MEDIUM	HIGH	EXTREME
	Medical attention and short-term incapacity	VERY LOW	LOW	MEDIUM	HIGH
	First aid needed	VERY LOW	VERY LOW	LOW	MEDIUM

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2. Documentation

Relevant Legislation/Standards	Y / N	Comments
Is plant required to be registered?	N	
Is a user license required?	N	
Key reference material:		<ul style="list-style-type: none"> AS/NZS 2243.3-2010 Safety in Laboratories: Microbiological safety and containment AS/NZS 2243.6:2010 Safety in laboratories - Plant and equipment aspects AS/2243:2:2021 Safety in laboratories – Chemical aspects and storage AS/NZS 3760 In service safety inspection and testing of electrical equipment American Chemical Society, 'Identifying and evaluating hazards in research laboratories' The Association of Independent Schools of New South Wales Ltd 'Science and Technology Work Health and Safety Risk management and assessment for practical activities' Safe Work Australia 'MANAGING RISKS OF HAZARDOUS CHEMICALS IN THE WORKPLACE Code of Practice May 2018' Guidelines for best practice for microbiology in Australian schools – ASSIST 2017 Chemical Management Handbook for Australian schools – ASSIST 2016

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3. Hazards

Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
<p>ENTANGLEMENT</p> <p>Can anyone's hair, clothing, gloves, cleaning brushes, tools, rags or other materials become entangled with moving parts of the tools or materials?</p>	Yes	Medium	Long hair, loose clothing, rags, cleaning brushes and jewellery could become entangled in the moving parts of the equipment, knock over equipment/vessels or become contaminated.	<p>Ensure hair, loose clothing, rags and jewellery is kept clear of moving parts when in use.</p> <ul style="list-style-type: none"> PPE (lab coats, safety glasses and gloves) Hair ties/hair nets can be used to secure long hair. <p>Ensure inappropriate jewellery and accessories (e.g. bracelets) are not worn when operating equipment.</p>	Low
<p>Condition of Equipment</p> <p>Is a hazard likely due to the age and condition of the experimentation equipment or materials? <i>(Consider how hard the machine has been worked, and whether it is used constantly or rarely).</i></p>	Yes	Medium	Damaged experimental equipment or storage vessels may result in spills, cuts, burns (both thermal and chemical) or contamination.	<ul style="list-style-type: none"> All equipment set up, cleaned and stored appropriately by trained personnel. All equipment maintained and inspected on an appropriate preventative maintenance schedule by appropriately trained personnel. 	Low

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
IMPACT & CUTTING INJURIES Can anyone be crushed/cut/struck etc. due to:	Yes	Moderate			
Broken/sharp glass	Yes	Moderate	Broken glassware can cause lacerations if contact with infectious microorganism or hazardous chemical, can cause severe infection with a potential of hospitalisation.	<ul style="list-style-type: none"> Adequate sharp waste disposal kit, Appropriate training in sharp decontamination. Adequate PPE per OHS guidelines. 	Low
Material falling off the workspace?	No			<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
Uncontrolled/unexpected movement of tools /workspace?	Yes	Medium	<ul style="list-style-type: none"> Unintended exposure to chemical/biological agents. Broken/sharp components Hot/cold surfaces Slip/trip hazard 	<ul style="list-style-type: none"> Ensure adequate space to complete work tasks. Ensure all persons instructed in proper techniques for setting up/operating in a workspace 	Low
Lack of capacity to slow, stop or immobilize tools?	No			<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
The tools tipping or rolling over?	No			•	•
				•	•
Parts of the tool disintegrating or collapsing?	No			•	•
Contact with moving parts during testing, inspection, operation, maintenance, cleaning or repair?	No			•	•
Contact with sharp or flying objects? (e.g. work pieces being ejected)	No			•	•
Inappropriate parts and accessories being used?	No			•	•
Other	No			•	•

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
ELECTRICITY Can anyone be injured or burnt due to:	Yes	Moderate			Low
Live electrical conductors? (e.g. exposed wires)	No			•	•
Working in close proximity to electrical conductors?	No			•	•
Access to electricity?	Yes	Moderate	<ul style="list-style-type: none"> Some experimentations may involve the production of electrical energy, via chemical or electromotive interactions 	<ul style="list-style-type: none"> Setup and supervision of experimentations done by appropriately trained personnel 	Low
Damaged or poorly maintained electrical leads, cables or switches?	Yes	Moderate	<ul style="list-style-type: none"> Damaged or frayed electrical cords pose an electrical hazard. 	<ul style="list-style-type: none"> Ensure equipment is regularly inspected, serviced, tested and tagged (if not hardwired) and appropriate isolation procedures (e.g. lock out tags) are in place 	Low

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Water near electrical equipment?	Yes	Moderate	<ul style="list-style-type: none"> Power supplies used for scientific equipment may require energising in the presence of water and other liquids. 	<ul style="list-style-type: none"> Ensure only the minimum amount of fluids used to successfully achieve outcomes. Isolate power and mop up any spills as soon as practicable. 	Low
Lack of isolation procedures?	Yes	Moderate		<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
Other	Yes	Moderate		<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
ERGONOMICS	Yes				
Can anyone be injured due to:					
Poorly designed workstation?	Yes	Medium	<ul style="list-style-type: none"> Design of workstation does not allow for adequate space to perform tasks. 	<ul style="list-style-type: none"> Allow adequate work area for user to avoid collision with other person/object 	Low
Repetitive body movement?	No			<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
Constrained body posture or the need for excessive effort?	Yes	Medium	<ul style="list-style-type: none"> Some equipment may require forcible action to setup/operate. Sudden/unexpected movement of workstation 	<ul style="list-style-type: none"> Users should avoid prolonged application of force, reassess appropriateness of tool/equipment. 	<ul style="list-style-type: none"> Low
Design deficiency causing psychological stress?	No			<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
Inadequate or poorly placed lighting?	Yes	Medium	<ul style="list-style-type: none"> Inadequate lighting may result in incorrect/improper experimental or preparation activities. 	<ul style="list-style-type: none"> Ensure adequate lighting to perform task. Additional lighting may be required if ambient/room lighting is insufficient 	<ul style="list-style-type: none"> Low
Does the activity impact on the surrounding workplace and create potential hazards? (Consider safe access and egress from plant, workflow and design of the workplace)	No			<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
Is the location of the workplace inappropriate? (Consider potential effects due to environmental conditions and terrain)	No			<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
<p>RADIATION</p> <p>Can anyone using the tool, or in the vicinity of the tool suffer injury or illness due to exposure to radiation in the form of any of the following:</p> <ul style="list-style-type: none"> • infra-red radiation • ultra violet light • microwaves 	No				
<p>FRICITION</p> <p>Can anyone be burnt due to contact with moving parts, materials or surfaces of the tool?</p>	No				

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
<p>NOISE Can anyone using the tool, or in the vicinity of the plant, suffer injury due to exposure to noise?</p>	No				
<p>SHEARING Can anyone's body parts be sheared between two parts of tool, or between a part of the tool and a work piece or structure?</p>	No				
<p>VIBRATION Can anyone be injured or suffer ill-health from exposure to vibration?</p>	No				

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
SUFFOCATION Can anyone be suffocated due to lack of oxygen, or atmospheric contamination?	No				

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
SLIPS / TRIPS / FALLS Can anyone using the tool, or in the vicinity of the plant, slip, trip or fall due to:	Yes				
Uneven, slippery or steep work surfaces?	Yes	Medium	<ul style="list-style-type: none"> Inappropriate placement of objects (e.g. spare materials, bags etc.) in the immediate vicinity of the plant equipment may result in trip hazard. 	<ul style="list-style-type: none"> Access to cleaning materials appropriate for a range of spill situations. 	<ul style="list-style-type: none"> Low
Poor housekeeping, e.g. spillage in the vicinity?	Yes	Medium	<ul style="list-style-type: none"> Poor housekeeping practices allowing the build-up of waste materials or failure to immediately clean up spills could result in a slip hazard. 	<ul style="list-style-type: none"> Ensure appropriate cleaning and housekeeping practices are maintained to minimise the risk of slips/trips 	<ul style="list-style-type: none"> Low
Obstacles being placed in the vicinity of the tool?	Yes	Medium	<ul style="list-style-type: none"> Trip hazards posed by bags, chairs etc 	<ul style="list-style-type: none"> Floors and walkways kept clear of all bags etc. 	<ul style="list-style-type: none"> Low

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
<p>Spills & Clean Up Can anyone be injured or suffer ill-health from spills or clean up</p>	Yes	Medium	<ul style="list-style-type: none"> Infection/contamination occurring due to spills/inadequate clean-up procedures 	<ul style="list-style-type: none"> Adequate chemical cleaning agents and absorbent materials readily available for decontamination/clean-up. All equipment maintained and inspected on a preventative maintenance schedule by appropriately trained personnel. Clean-up and decontamination of work site to be completed by the participant/student after conducting experimentation. Experimentation equipment to be cleaned with appropriate cleaning devices/substances and sterilised where applicable. 	Low

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
Disposal of chemical/biological agents	Yes	Medium	<ul style="list-style-type: none"> Inappropriate disposal of chemical agents Spill of chemical agent. Laboratory cleaning staff Spills of chemical agents may induce increased hazard greater than that of a normal slip/trip/fall. 	<ul style="list-style-type: none"> Disposal of excess and waste chemicals done in accordance with their MSDS and EPA requirements. Appropriate chemical isolation and spill clean-up measures in place prior to experiment. Informed by MSDS and experiment HIRAC. All staff involved with the clean-up of the laboratory to be inducted into the space and made aware of intrinsic hazards. Cleaning staff to have contact details of appropriate BTS staff in case of laboratory accident. 	

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
<p>Experimentation Can anyone be injured or suffer ill-health from undertaking experimentation</p>	Yes	Medium	<ul style="list-style-type: none"> • Handling of chemical agents. • Use of experimental apparatus. • Unexpected energetic activity 	<ul style="list-style-type: none"> • Use of relevant PPE as determined by MSDSs. • Laboratory activity supervised by appropriately trained personnel. • Use of all equipment and experimental procedures provided. • Experimentation conducted under supervision of appropriately trained personnel. 	Low

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
Microbial hazards	Yes	Medium	<ul style="list-style-type: none"> Personnel working with microbial agents may become contaminated/infected if proper laboratory etiquette is not maintained. 	<ul style="list-style-type: none"> Risk Assessment to be completed on each microorganism used in experimentation to inform personnel of correct clean-up procedures. Only microorganism classed as no higher than "Risk Group 1" are to be used in the laboratory. Review MSDS for all chemicals being used in experiment prior to any experimentation. Induction and supervision of personnel by appropriately trained person 	Low

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
<p>Storage</p> <p>Can anyone be injured or suffer ill-health from inadequate storage of agents/equipment</p>	Yes	Medium	<ul style="list-style-type: none"> • Unintended/inappropriate access and use of chemical agents. • Unintended mixing of incompatible materials • Excess of chemical agents. • 	<ul style="list-style-type: none"> • Ensure appropriate labelling of all chemical vessels is maintained. • Ensure storage of chemicals is done considering the safe handling and storage incompatibilities as laid out in individual MSDSs • Ensure quantities of chemicals used are kept to a minimum as per appropriate safety standards. • Regularly inspect stored chemicals to ensure there are no leaks or spills due to corrosion/damage to storage vessels. • Segregate chemicals into appropriate chemical storage cabinets, as per their MSDS. • Ensure appropriate ventilation in storage area so as to avoid build-up of hazardous gasses. 	Low

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
FIRE & EXPLOSION	Yes				
Can anyone be injured by fire?					
Can anyone be injured by explosion of gases, vapours, liquids, dusts, or other substances?	Yes	Medium	<ul style="list-style-type: none"> Some chemical reactions may be volatile resulting in explosion or fire. Experimental equipment or materials may become a source of ignition if left unattended or equipment/experimentation active for excessive length of time. Use of flames (Bunsen burners etc.) in some experimentation activities. 	<ul style="list-style-type: none"> Setup and induction into equipment use & experimentation methods by appropriately trained personnel. Use of appropriate PPE Ensure access to appropriate fire suppression methods. Ensure Bunsen burners etc are properly connected and maintained prior and post use. Activities involving explosive vapours only conducted in well ventilated spaces so as not to trap/pool vapour pockets. 	<ul style="list-style-type: none"> LOW

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
TEMPERATURE / MOISTURE Can anyone come into contact with objects at high or low temperatures?	Yes				
Can anyone suffer ill-health due to exposure to high or low temperatures?	Yes	Medium	<ul style="list-style-type: none"> Some equipment and processes may produce temperatures at a level that can cause harm if contact made with persons. 	<ul style="list-style-type: none"> Setup and induction into equipment use & experimentation methods by appropriately trained personnel. Appropriate signage to indicate hot surface Use of appropriate PPE 	<ul style="list-style-type: none"> Low
Can anyone be injured or suffer ill-health due to exposure to moisture?	Yes	Medium	<ul style="list-style-type: none"> Some chemical reactions may be endo/exothermic resulting in objects/surfaces becoming cold or hot. Moisture in the form of condensation may result 	<ul style="list-style-type: none"> Setup and induction into equipment use & experimentation methods by appropriately trained personnel. Appropriate signage to indicate hot surface Use of appropriate PPE 	<ul style="list-style-type: none"> Low

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
OTHER Can anyone be injured or suffer ill-health from exposure to:	Yes	Medium			

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
Chemicals?	Yes	Medium	<ul style="list-style-type: none"> Possible for chemical spills could occur during normal use. Exposure to some chemical agents (pure elements, compounds, solutions, suspensions or any combination of the above.) May pose a risk to health and safety if chemicals come into contact with users or other chemical agents, or if resultant fumes are inhaled. Skin corrosion Irritation Eye damage Organ toxicity Respiratory tract irritation category 3. Eye irritation category 2A 	<ul style="list-style-type: none"> Provide appropriate storage of chemicals Provide training and guideline when working with dry chemical, Fungi spore, microorganisms Obtain and review Material Safety Data Sheet (MSDS)s for all chemicals/materials used prior to undertaking laboratory activity. Use of relevant PPE as determined by MSDSs. Ensure appropriate ventilation in activity workspace. Storage, set-up experiments and disposal undertaken by appropriately trained personnel. 	Low

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
Toxic gases or vapours?		Medium	<ul style="list-style-type: none"> Inhalation of the chemical gases 	<ul style="list-style-type: none"> Use fume hood when conducting experiments requiring high ventilation Maintain proper ventilation of the laboratory. 	<ul style="list-style-type: none"> Low
Fumes/Dusts?			<ul style="list-style-type: none"> Some chemical reactions may result in the production of harmful gasses. 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
Other? (please specify)				<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

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Hazards Inspected		Initial Risk	Description of Risk	Control Measures	Residual Risk
<p>Storage and Disposal Can anyone be injured or suffer ill-health from improper storage/disposal of chemical/biological agents</p>	Yes	Medium	<ul style="list-style-type: none"> Improper storage or disposal may result in undesired growth/reactions leading to infection/harm/contamination 	<ul style="list-style-type: none"> Microbial organisms correctly labelled and stored in appropriate repository when not in use. Appropriate storage and disposal of all waste chemicals and completed experimentations, including biological waste. Ensure all waste materials are stored and disposed of in accordance with EPA policy and organism specific HIRAC. 	Low

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<p>Contamination or Infection Can anyone be injured or suffer ill-health from exposure to chemical/biological agents</p>	Yes	Medium	<ul style="list-style-type: none"> Pre-existing cuts/abrasions may pose a contamination risk. Food or drink brought into the laboratory may introduce or become contaminated by microbial agents. Infection of microbial agents may result in illness. 	<ul style="list-style-type: none"> Any pre-existing cuts must be properly covered and kept dry to reduce the risk of infection. No food or drink is to be brought into or consumed in the laboratory. All personnel conducting experimentation to thoroughly wash hands at completion of activity. Use of PPE to limit contact with microbial agents 	Low

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4. Risk Assessment Signoff

Authorised By:

Damon Minotti – Associate Director BTS

Signature:

Date:

01/2023

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