University of Wollongong

Faculty of Engineering

Laboratory Safety Guidelines 2008

Materials Engineering Building 1 Laboratories

Staff/Student Name: _____

OH&S Induction Acknowledgement

- Must be completed and signed before any work is carried out in the Materials Engineering Laboratories.
- After hours access will not be considered if this form is not complete.

1. I have read, and understand this document. I agree to follow all the guidelines set out in this document.

2. I have completed the required induction for this Laboratory.

3. I agree to complete a risk assessment or follow the safe work procedure before any work is undertaken in the laboratories.

4. I am trained to use the following equipment:

EQUIPMENT	DATE	SUPERVISORS SIGNATURE

Student/Staff Name: _____ Student/Staff Number: _____

Student/Staff Signature: _____ Date: _____

Induction Date: _____ Trainer's Signature: _____

Trainer's Name: _____

Academic Supervisor's Name: _____ Date: _____

Academic Supervisor's Signature: _____

Copies: Laboratory files

Other items may include (will vary depending on area):
Radiation guidelines
After hours access
Risk assessments
Induction process checklist
Use of specific equipment

1. Introduction

Laboratories contain many potential safety hazards. However, with proper control these hazards can be reduced. This manual is intended to outline the basic laboratory safety requirements for the Building 1 Materials Engineering Laboratories.

2. Responsibilities

The responsibility for implementation of these procedures rests with the Deans and Heads of School. The Faculty of Engineering Workplace Advisory Committees will provide advice and feedback to Deans and Heads on actions needed to comply with these procedures. The School Safety Committee is responsible for the implementation of the University OH&S policies. These groups will be able to seek advice from the Occupational Health & Safety Unit.

2.1 Deans and Heads of School

Heads of Cost Centres have an overall responsibility for ensuring that occupational health and safety standards and practices are implemented and maintained in the teaching facilities, laboratories and studios by their respective supervisory staff.

To achieve compliance, Deans and Heads of School should:

- ensure that staff and students receive the appropriate information, instruction and training necessary for them to perform work safely;
- ensure that all staff and students receive an induction that includes information pertaining to emergency response procedures and personnel;
- ensure that local occupational health and safety procedures are developed, documented and issued to staff and students as appropriate;
- ensure that the facilities and equipment provided for staff and students are safe and suitable for the types of work to be carried out;
- ensure that adequate financial provisions are made for occupational health and safety equipment and materials and the maintenance of occupational health and safety standards;
- ensure that hazard identification and risk assessment procedures are developed, documented and maintained for the use, handling, storage, transport and disposal of equipment, materials and substances and that appropriate risk controls are implemented and maintained;

2.2 Supervisors and Subject Coordinators Of Honours And Postgraduate Students

As honours and post graduate research is a major aspect of work undertaken in laboratories, it is essential that adequate supervision is provided to maintain safety. Supervisors and subject coordinators are to :

- Actively practice and develop in their students proper attitudes towards occupational health and safety matters;
- Control the risks associated with the work that they supervise using a documented risk management process;

- Ensure that safe work practices are developed and maintained at all times;
- Arrange for their staff and students to be instructed in safe and healthy work procedures, and ensure that they are fully informed about particular hazards, and how to avoid, eliminate or minimise them;
- Ensure that good housekeeping standards are developed and maintained in the areas under their control;
- Ensure that staff and students under their control use safety equipment provided in a correct manner;
- Ensure that all students understand the disciplinary procedures that will be invoked for non-compliance with occupational health and safety instructions, policies and procedures;
- Ensure that all incidents, hazards and 'near miss' incidents that occur are reported on the hazard & incident report form.

2.3 Staff and Students

All staff and students who undertake work in laboratories must take reasonable care of their own health and safety and the health and safety of others by:

- Taking action to avoid, eliminate or minimise hazards of which they are aware;
- Complying with all occupational health and safety instructions, policies, and procedures including departmental safety manuals;
- Making proper use of all safety devices and personal protective equipment;
- Complying with the instructions given by emergency response personnel such as emergency wardens and first aiders;
- Not willfully placing at risk the health and safety of any other person;
- Seeking information or advice where necessary before carrying out new or unfamiliar work;
- Maintaining dress standards appropriate for the work being done. Appropriate protective clothing and footwear must be worn at all times;
- Only consuming or storing food and drink in designated areas;
- Being familiar with emergency and evacuation procedures and the location of, and if appropriately trained, in the use of, emergency equipment;
- Reporting all incidents, hazards and 'near miss' incidents on the Hazard & Incident Report form.

3. Safe Conduct

The following recommendations extracted from AS2243 Safety in Laboratories, details the standard behavior for all personnel working within a laboratory.

(a) Never adopt a casual attitude in the laboratory and always be conscious of the potential hazards.

(b) Ensure that personal clothing is suitable to laboratory conditions, e.g. non-slip, closed-in footwear. Do not wear open-toed shoes in the laboratory.

(c) Always wear eye protection when in the laboratory area.

(d) Use protective clothing and devices appropriate to the type of operation being carried out, giving due consideration to the work being carried out in the vicinity.

(e) Never run in the laboratory or along corridors.

(f) Never indulge in reckless behavior in the laboratory.

(g) Always exercise care when opening and closing doors and entering or leaving the laboratory.

(h) Do not carry out hazardous work in isolation in a laboratory; ensure that at least a second person is within call.

(i) Do not handle, store or consume food or drink in the laboratory.

(j) Do not store food or drink in a refrigerator which is used to store laboratory materials.

(k) Do not smoke within any university building.

(l) Regard all substances as hazardous unless there is definite information to the contrary.

(m) Before any work is carried out in the laboratory, permission must be obtained from the officer in charge. Never undertake any work unless the potential hazards of the operation are known as precisely as possible, and the appropriate safety precautions are adopted.

(n) Any materials coming into the laboratory are to be accompanied by documentation detailing the source, type, quantity and any known characteristics. Particularly those relating to hazardous materials. This documentation is to be stored in a file specifically for this purpose and is to be readily available to all staff. Always use safety carriers for transporting chemicals in glass or plastic containers with a capacity of 2 L or greater. Never carry containers of mutually reactive substances at the same time.

(o) Take additional care when carrying any potentially hazardous substance.

(p) Never store mutually reactive substances in the same area. (See relevant State authority guidelines.)

(q) Keep only the minimum required quantities of hazardous substances in the laboratory work area.

(r) Always use a fume cupboard, fume cabinet or glove box when working with highly toxic, volatile or odoriferous substances.

(s) Wash skin areas which come in contact with chemicals, irrespective of concentration.

(t) Keep all fire-escape routes completely clear at all times.

(u) Label all safety equipment and maintain it in good operating condition. Check and inspect safety equipment for correct operation in accordance with the manufacturer's instructions and report, in writing, any requirement for maintenance.

(v) Ensure that all safety equipment remains accessible to the laboratory personnel at all times.

Refer to appendix 1 for a list of supervisors for Materials Engineering Laboratories.

Safety information and emergency procedures are displayed in each laboratory. Useful information follows:

EMERGENCY PHONE LOCATIONS

Outside the main entrance to Building 1.(south side)
In the main foyer of Building 4. (Speed Dial) Refer to list
Hallway entrance into High bay area.Building 4

FIRST AID BOX LOCATIONS

First aid kits are kept with Greg Tillman room (1.G09A) & Jose Gozalez room (1.G11) and in the upstairs tea room (1.113).

i) fire brigade. (0)000
ii) ambulance. (0)000
iii) safety office. O.H.&S. unit-Darren Smith. 4221**3914**;
iv) hospital. 42298233 (Casualty)
v) police. Emergency. (0)000. or Wollongong Police-42267899.
vi) Security. 4900 **(EMERGENCY**)
vii) Security. 4555(Safety Escorts assistance or enquiries)
viii) First Aiders. Bld 1 Greg Tillman. Ext 3024 room G09A & Jose Gonzalez Ext 5244 room G11.

(w) Clean up spills immediately. Read M.S.D.S. for spill clean up information. Read helpful information enclosed in individual laboratory addendum for emergency spill clean up procedures.

(x) Dispose of specialized wastes (e.g. broken glassware, biological and radioactive substances) in containers reserved for the particular type of waste.

4. Housekeeping

Housekeeping is an important component in laboratory safety to ensure risk of injury from potential hazards in the environment are controlled. The following precautions are to be taken to ensure the safety of personnel within laboratories :

- Floors are to be kept tidy and dry
- Benches are to be kept clean and free from chemicals and apparatus that are not being used.
- Aisles and exits are to be kept free from obstructions.
- Bottles and glassware are to be kept off the floor.
- Access to all emergency equipment (fire extinguishers, first aid kits, chemical spill kits, emergency shower and eye washes) are to be kept free from obstruction.
- Work areas and equipment are to be thoroughly cleaned after use.
- If last to leave the laboratory, make sure equipment is turned off, flames are extinguished etc.

- The interior of fume cupboards and nearby areas are kept clean and clear.

- All apparatus left running overnight should be shielded and labelled with name and telephone number of person to be contacted.

- If contractors are working in your area, make known to them any hazards which may exist in your area, ie flammable liquids.

5. Emergency Procedures

In the event of fire or other emergency that may endanger staff and students the following procedures apply -

- In the event of a fire alert others in the immediate area. Then dial (0) 000 and ask for the Fire Brigade and give details. Call security, 4900, and inform them of the fire and it's location.

- Inform the nearest Warden or Departmental Head. Wardens for Bld 1: Professor Geoff Spinks room 111 / Dr David Wexler room 109 1st floor wardens. Mr Greg Tillman room G 09a / Mr N Mackie Ground floor wardens.

- When an alarm is raised proceed quickly to the nearest exit as directed by an Evacuation Official.

- After leaving the building proceed as directed to the marshalling area. Do not return to the building until the "All Clear" is given by the Security Manager or delegate.

6. Safety Equipment

Laboratories at the University are equipped with a number of safety features.

6.1 Safety Showers

Safety showers to be used in the situation of chemical contamination etc. Safety showers are in all laboratories containing fume cupboards.

6.2 Eye Wash Sprays

Eye wash sprays are built in combination with the safety showers to flush the eyes if chemicals are splashed into them. In the event of chemicals splashing in the eyes, the stream of water from the spray should be directed into the eye for a period of 15 minutes before seeking medical attention.

6.3 Fire Extinguishers

This equipment is provided in all laboratories to extinguish minor fires only. If there is any risk from the fire the building should be evacuated. Before using a fire extinguisher read the instructions ensuring that it is appropriate to the type of fire.

Dry Powder Extinguisher - Colour coded red with a white band. For use on electrical and flammable liquids fire.

Carbon Dioxide Extinguisher - Colour coded red with a black band. For use on electrical and flammable liquids fire - It should be noted that this extinguisher can be safely used on all types of fires, however when gas dissipates re-ignition can take place.

B.C.F. Extinguisher - Colour coded bright yellow. For use on electrical and flammable liquid fires. Can be used safely on all types of fires, however it should not be used in a confined place. (The use of B.C.F. and all halon extinguishing agents are being phased out).

- **Chemical Storage**

The proper storage of chemicals is an important safety issue in the Laboratory. Storage of chemicals is regulated in NSW by the Dangerous Goods Act and Regulations with Dangerous Goods being:

Class 1	Explosives
Class 2	Gases - compressed, dissolved or liquefied
Class 3	Flammable & Combustible liquids
Class 4	Solids - Flammable, spontaneously flammable or dangerous when wet
Class 5	Oxidizing Substances
Class 6	Poisons
Class 7	Radioactive Materials
Class 8	Corrosive substances

In the laboratory, although the range of chemicals is large, the quantities are under licensing amounts. Regardless of this lack of regulation, there is a potential danger from even small quantities of chemicals which can be minimised with proper storage.

The following requirements should be followed when storing chemicals.

- Chemicals of different Dangerous Goods Class must be segregated.
- All chemicals will be kept in a secure lockable store or area.
- Storage facilities should be constructed of suitable material e.g. Acid stores should be constructed of timber with an acid resistant coating.
- Acids should be stored on lower shelves of store and in trays.
- All containers of liquids should be stored on lower shelves.

8. Flammable Liquids

When handling flammable liquids the following points should be followed:

- Flammable liquids must be kept away from all sources of ignition.
- All electrical equipment used near flammable Liquids should have spark proof wiring.
- When heating flammable liquids use only steam or water baths or heating mantles. Extreme care must be exercised to ensure that there is no source of ignition.
- Appropriate fire extinguishers and fire blankets must be easily accessible when handling flammable liquids.

Flammable liquids are classified under the Dangerous Good Act as Class 3 Dangerous (identified with a red flammable liquids diamond label) which is then subdivided into 4 Classes.

Class 3.1 Liquids with a flash point below -18°C, up to but not including 23°C. Examples include : Benzene, Carbon Disulphide, Ethanol and Petrol.

Class 3.2 Liquids with a flash point of 23°C, up to and including 61°C. Examples: Cyclohexanone, Kerosene.

Class 3.3 Liquids with a flash point greater than 61°C, up to but not including 1 50°C. Examples: Diesel Fuel, Heating Oil.

Class 3.4 Liquids with a flash point greater than 150°C. Examples: Cottonseed Oil, Linseed Oil.

The maximum quantity of flammable liquid that maybe kept without special facilities are:

Class 3. 1	5 litres
Class 3.2	25 litres
Class 3.3 and 3.4	500 litres

Quantities up to 100 litres of class 3.1 and 3.2 must be stored in an approved flammable liquids storage cabinet. Quantities up to 250 litres may also be stored in a cabinet providing that a license has been obtained from the Dangerous Goods Branch of the Work Cover Authority.

Quantities of Class 3.1 and 3.2 flammable liquids in excess of 250 litres must be stored in a licensed flammable liquids store.

9. Gas Cylinders - Compressed & Liquefied Gasses

Compressed, liquefied or dissolved gases are categorised as Class 2 dangerous goods and sub-categorised as:

Class 2.1	Flammable gases identified by a red dangerous goods diamond (eg butane)
Class 2.2	Non-flammable and non-toxic gases identified by a green dangerous goods diamond (eg helium)
Class 2.3	Poisonous gases identified by a white dangerous goods diamond (eg ammonia)

In instances where the gas presents multiple hazards additional diamonds indicates the subsidiary risks. For example, Chlorine Class 2.3 (toxicity) and Class 5.a (oxidising agent)

9.1 Moving Cylinders

The majority of accidents involving gas cylinders occur while moving them from one location to another. The following control measures should be used to reduce the potential for an accident:

- The use of purpose-built trolleys or other suitable devices for gas cylinder transportation.
- Securing the gas cylinders valve, disconnecting and removing associated distribution equipment
- Shutting the cylinders valve, disconnecting and removing associated distribution equipment
- A requirement that only properly trained personnel are permitted to move cylinders
- Laboratory procedures preventing the manual movement of larger gas cylinders

9.2 Storage of Gas Cylinders

The guidelines for the storage of gas cylinders are detailed in AS 4332 The Storage and Handling of Gases in Cylinders. For more information please refer to the AS 4332.

The following table outlines the quantities described as 'minor storage' of gases in cylinders.

Class of Gas	Maximum aggregate water capacity, L
2.1	500
2.2	2000
2.2, with class 5.1 Subsidiary risk	1000
2.3	50

Where gases of mixed classes are kept in minor storage, the aggregate quantity of all gases shall not exceed 2000L and the quantity of each subclass shall not exceed that given in the table above.

The following precautions shall be observed for minor storage and handling of gas cylinders:

- Gas cylinders are to be kept away from artificial sources of heat, ie radiators, boilers or steam pipes; and kept clear.
- Gas cylinders shall be provided with adequate ventilation at all times.
- Classes of gas cylinders shall be segregated within the store, but need not be separated.
- Outdoor storage of Class 2 cylinders shall be separated fro mother dangerous goods by 3 metres. They shall not be less than 1m from any door, window, air vent or duct.
- All gas cylinders are to be secured in the upright position by chain or other means to prevent falling

Indoor storage of gas cylinders should be avoided wherever possible. However where it is not reasonable to have an outdoor cylinder and reticulation system, the keeping of gas cylinders shall incorporate a risk management approach. Specific precautions which a risk assessment is to include would be :

- The total capacity of gas in cylinders allowed for any particular indoor location shall include cylinders in use, spare cylinders not in use, and used cylinders awaiting removal.
- The total capacity of the gases kept shall not exceed one minor storage quantity per 200 m^2 of floor area. Where the floor area exceeds 200m^2 any arrangement which results in an undue concentration of cylinders shall be avoided.
- Indoor minor stores of gases in cylinders shall be separated from other minor stores of gases or other dangerous goods stores by a minimum distance of 5 m.
- Except for Class 2.2 gases having no subsidiary risks, there shall be no minor storage in basements.
- Where cylinders are kept inside a building or a confined area, e.g. a shipping container, that building or area shall be adequately ventilated by natural air movement or equivalent.
- Never travel in an elevator with gas cylinders.

10. Safe Handling of Cryogenic Fluids

Cryogenic fluids are defined as fluids having a boiling point below -150°C at atmospheric pressure. Cold contact burns, frost bite, suffocation, lung disorder and general body cooling can result from exposure to cryogenic fluids. In addition, liquid oxygen and hydrogen present a fire hazard. it should also be noted that liquid nitrogen although not flammable in itself is sufficiently cold to condense oxygen out of the atmosphere which can then present a hazard. The following procedures should be followed when handling cryogenic fluids.

10.1 Personal Protection

In all cases, eye and hand protection should always be worn. The need for additional safety protection, outlined below, will depend upon the operation being carried out and the quantity of liquid involved.

- A full face shield (see AS 1336) when transferring liquid, immersing objects or any other time when splashing may occur,
- Use fit, clean dry insulated gloves when carrying cryogenic fluids in containers
- Use appropriate safety clothing that minimises the formation of traps capable of holding liquid near the skin
- Use enclosed footwear.
- Never travel in an elevator with cryogenic liquids.

10.2 Transfer techniques

The following techniques can be used when transferring cryogenic fluids to secondary containers:

- Pressurisation (conventional method) using pressure creating by heat leak into the storage container, by a heat source with the container, or by pressurisation with a gas corresponding to the liquid product.

- Submersible electrically operated pump for the transfer of liquid nitrogen, though precautions will be required to prevent condensate entering and freezing in the pump especially when changing containers. This method is not recommended for liquid oxygen transfers.
- The use of transfer tubes approved by the supplier of cryogenic container.

- Pouring using a filling funnel with the top of the funnel partly covered to reduce splashing.

10.3 Proprietary Equipment

Proprietary equipment such as cryostats and liquefiers, should always be operated and maintained in accordance with the manufacturer's instructions. Regular maintenance and inspections should be arranged.

10.4 Working at Reduced Pressure

If the pressure on a cryogenic liquid is reduced below atmospheric, the following additional precautions should be taken:

- Check that the system is vacuum-tight to prevent moist air being drawn in and forming ice plugs.

- Provide a protective screen when working with glass dear flasks.

- Carefully control initial pumping speed to avoid pressure oscillation and liquid entertainment.

- Prevent violent boiling of superheated liquid by inserting boiling centres, compatible with the liquid in use, inside the dear flask. This precaution is especially necessary when working with nitrogen in a glass system.

When the backing pump is used to pump evolved gas into a valved recovery system, provide a pressure-relief valve on the exhaust side of the pump, to protect against pump operation with recovery valves shut.

11. Chemical Spills

When a spill of a chemical substance occurs, the following procedures should be followed.

- Establish what material has been spilt and what personal protective measures should be followed. This information can be obtained from a Material Safety Data Sheet (MSDS) from the Chemalert Database. Specific information on spills clean-up method should be obtained from the MSDS.

- Prior to commencing spill clean-up, ensure that you are wearing the appropriate protective equipment. It should be noted that even small quantities of volatile materials spread over a surface in a confined space could generate significant concentrations of fumes, requiring respiratory protection to be worn.

- Spills control kits have been placed in a number of areas of the University. These kits contain protective equipment, absorbents and neutralisers.The spill controls kits in Building 1. are in the listed locations. Rooms (GO9C) / ((G10) / (126)
- The first step in a spills procedure is containment. Chemsorb absorbent pillows should be placed around the spill forming a bund to control the spread of the spill. (It should be noted that Chemsorb is not to be used on HF spills).

- General procedures include:

    - Organics - use vermiculite as absorbent.
    - Acids or alkalis - first neutralise then absorb with paper towel, cloth or mop.
    - Mercury - cover with sulphur then remove with dust pan and a broom before placing in a sealed container.

- At the completion of the spill clean-up, all absorbent or contaminated material should be placed in sealed containers, labelled and disposed of as contaminated waste.

12. Fume Cupboards

To avoid the exposure of staff to fumes in laboratories, fume cupboards are provided. To ensure the effectiveness, the following guidelines should be followed.

- All fume cupboards should have regular checks of their face velocity. The required face velocity is 0.5 metre/second. Measurements should be in accordance with the Australian Standard 2243.8, Appendix B.

- Check that the previous user has cleaned and decontaminated the fume cupboard.

- Make sure that there is enough space in the cupboard to enable the proposed work to be carried out.

- Position apparatus and material to the centre and rear of the fume cupboard to minimise disturbance to the air flow at the face. Wherever possible place all the required equipment in the cupboard before commencing procedure.

- It should be noted that drafts from windows and doors can effect the performance of the cupboard.

- Before commencing any procedure check that the fume cupboard is working correctly. It is not enough to just switch on the fan.

- Wherever possible keep the sash of the cupboard as low as possible when working at a fume cupboard.

- At completion of the procedure remove all waste from the cupboard and decontaminate.

- If hazardous chemicals are to be stored in the cupboard then the exhaust fan should be kept continuously running.

- It should be noted that any work involving the use of perchloric acid must be carried out in fume cupboards that are specifically designed for use with perchloric acid.

- If unsure of any chemical spills you find in the fume cupboard, contact Greg Tillman before proceeding with clean up.

13. Glassware

The largest single cause of injury in the laboratory is broken glassware. The following precautions should be taken:

- All glass ware must be securely stored so as to minimise the risk of breakage.

- All glass tubing should have the ends flame polished.

- Do not use broken or chipped glassware.

- When cleaning glassware, protective gloves should be worn; commercial cleaning agents should be used; chromic acid should only be used as a last resort.

- All broken glass should be placed in bins that are marked broken glass only; broken glass should not be placed in normal waste bins.
- Glassware that requires modification by glass blowing must be thoroughly washed prior to this operation to avoid oral poisoning or explosion that may result from heat or a source of ignition being applied to residues.

- Pipetting by mouth is not allowed; pipette pumps must be used.

14. Refrigeration

Refrigeration is commonly used in laboratories and a number of safety precautions needed to be taken including :

- Care must be taken when using domestic refrigerators in laboratories to ensure that flammable liquids are not stored in them. Sparks from thermostats and light switches can ignite fumes leading to explosion.

- Flammable liquids requiring refrigeration should be stored in refrigerators that are intrinsically safe. (Refrigerators that have spark proof wiring).

15 Needle-Stick Injuries and Other exposures

In the event of exposure such as needle-stick or a cut, or a mucous membrane exposure to blood or other body fluids, the following procedures should be implemented:

- Treat the puncture wound or cut by liberally washing with soap and water and/or diluted hypochlorite solution.
- If the face is splashed with blood, rinse the eyes and mouth gently with water to minimise the risk of infection.
- Ensure all incidents are reported to the laboratory supervisor, a Hazard and Incident Form is completed and medical attention is sought.
- If possible, identify the source material and test for the presence of HIV or Hepatitis B.

If the source material tests positive or is unknown:

- The employee or student should be counselled regarding the risk of infection and should be clinically evaluated.
- For suspected HIV exposure, immediate treatment should be considered by the medical officer and the worker should be retested in three months. If negative, further retesting in six months time is required.
- For suspected hepatitis B exposure vaccination should be administered immediately unless the person has already been vaccinated effectively within the past five years. If the person does not respond to the vaccine then treatment should be commenced.

16 Working Alone

Working alone refers to situations where people may be exposed to risks because :

- the area they are working in is remote from others or isolated from the assistance of others because the nature, time or location of their work; or
- it involves the operation or maintenance of equipment, or the handling of a hazardous substance; or
- the work is dangerous for a person to perform alone.

Where any of the above is applicable, working alone should be avoided. However, in certain occasions this may not be practicable as the risk may be able to be managed.

An assessment of the risks associated with each identified working alone situation shall be completed in consultation with those working alone to formulate practical solutions to manage working alone situations. The risk assessment should be completed in accordance with the Risk Management Guidelines.

The risk assessment shall include arrangements for adequate communication systems for regular monitoring. Arrangements can be made prior to the commencement of work with Campus Security to notify arrival and departure details.

17 After Hours Access

Normal operating hours for the Building 1 Materials laboratories is Monday to Friday, 8am to 5pm. During these times technical staff are available to monitor the operations of the laboratories. Anyone requiring access outside of normal operating hours is required to have formal approval by the Dean, Faculty of Engineering

It is important that the Working Alone guidelines and Risk Management Guidelines be followed at all times – see above.

It is a general rule that undergraduate students DO NOT have after hours access. Undergraduate students requiring after hours for a specific time or a specific purpose must apply to the Dean of Engineering on the appropriate form. The form must be authorised by the relevant Academic Supervisor and a copy of the OH&S Induction Acknowledgement form and risk assessments must be attached.

Staff and Research Students requiring after hours access are required to have an approved After Hours Access form. Before being approved by the Dean, the After Hours Access forms must be approved by the Academic Supervisor and have a copy of the OH&S Induction Acknowledgement form and risk assessment attached.

When working after hours the completed After Hours Access form and Staff/Student ID, must be available for inspection by Faculty Staff or Security. If not, you will be required to leave the laboratory immediately.

Staff and students (and any accompanying person) must sign in and out of the laboratory, using the sign on books provided at the entrance to the laboratory. The name(s), location, time of entry, mobile phone number (if available) must be recorded for all persons entering the laboratory.

All accompanying persons must be over 18 years of age and be briefed on emergency procedures and phone contact numbers by the staff/student having access to the laboratory.

In general:

- Ensure that the doors of buildings are securely closed and locked after entering and leaving the building.
- Ensure that the doors to internal areas are secured on leaving.
- Ensure that you are familiar with the safety rules and emergency contact numbers (displayed in laboratory)
- Report to University Security any breaches of security or suspicious behaviour.
- Do not give anyone else security codes, keys or access cards.
- Do not provide access to buildings to unauthorised persons.

No equipment may be operated unless:

- Two persons are present.
- The operator has received training in its use.
- You have proof of induction to use the equipment.

A breach of any of the conditions will result in after hours access being immediately cancelled. Any future request for after hours access will require personal consultation with the Dean of Engineering.

18 Further Information

As the information in these guidelines are not comprehensive to cover all operations occurring in the University's laboratories further advice should be consulted through the appropriate Australian Standards:

AS2243.2 Chemical Aspects

AS2243.4 Ionizing radiations

AS2243.5 Non-ionizing radiations

AS2243.6 Mechanical aspects

AS2243.7 Electrical aspects

AS2243.8 Fume cupboards

AS2243.9 Recirculating fume cabinets

AS2243.10 Storage of chemicals

18 Program Review

As part of a continuous improvement system this program shall be reviewed on a regular basis or upon recommendation of the OHS Central Committee. A review by the OH&S Unit will take place biannually.

APPENDIX 1

MATERIALS LABS BLD 1	***ACADEMIC IN CHARGE***	***TECHNICAL SUPPORT***	***LOCATION***
EM	Z.CHEN	N MACKIE G TILLMAN	1/G14 G15 G16 G17 G18
MATERIALOGRAPHY	G SPINKS	G TILLMAN	1/G09 G10 G13
UNDERGRADUATE TEACHING LABORATORY	SPINKS	G TILLMAN NICK MACKIE	1/GO7
NANO TECHNOLOGY LABORATORY	G SPINKS	G TILLMAN	1/G05
X RAY DIFFRACTION	A CALKA	N MACKIE G TILLMAN	1/G08
MECHANICAL TESTING	SPINKS	B DEJONG	1/G12
ELECTRO-MECHANICAL SYNTHESIS	A CALKA	NONE ALLOCATED	1/112
HIGH TEMPERATURE POWDER PROCESSING	A CALKA	NONE ALLOCATED	1/115
MELT PROCESSING LABORATORY 1	B MONAGHAN	NONE ALLOCATED	1/116
MELT PROCESSING LABORATORY 2	NIGHTINGALE	NONE ALLOCATED	1/119
ELECTROCHEMISTRY	GX WANG	R KINNELL	1/122
HEAT TREATMENT	A CALKA	G TILLMAN	1/125
DILATOMETRY & THERMAL ANALYSIS	SPINKS	B DEJONG	1/127
H.F LABORATORY	G SPINKS	G TILLMAN	1/126A
LECO ANALYSIS	B MONAGHAN	NONE ALLOCATED	1/126B