

**SCIENCE INDUCTION** 

**Module 01:** Emergency Procedures / Hazard and Incident Reporting

UTS CRICOS PROVIDER CODE: 00099F

#### **ESCAPE FROM UTS VIDEO**

- Go to this page and watch the Escape from UTS video
- This must be viewed annually

https://www.uts.edu.au/file/escape-uts

- Dial "6" for emergency
  - Any internal phone
  - Connects to Security 24/7
- From external phones or mobiles
  - Dial 1800 249 559

#### Evacuation

- Two phase:
  - alert tone (beep-beep); prepare to evacuate
  - evacuate tone (whoop-whoop); evacuate to the assembly point
- Wardens (Red Caps) follow their directions
- Assembly point: middle of Jones St TAFE pedestrian mall (next slide)
- phased zone evacuation means different floors will be in alarm and will evacuate at different times





Jones St assembly point © 2014 Google

Security will meet you at the Assembly Area and advise you when it is safe to go back inside the building. Don't congregate near road, move further down.

#### **EMERGENCY PROCEDURES: POSTERS**

- Located throughout building
- Contain Evacuation procedures and Emergency response
- A "You Are Here" map showing Evacuation route and EXITS

#### **Building 4**



#### **Building 7**

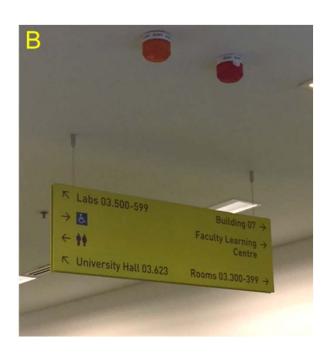


## **BUILDING SIGNAGE**









- A. Follow EXIT signs
- B. Note ALERT and EVAC flashing lights in corridors and labs (for hearing impaired)

#### **FIRE DOORS**



- Most lab doors are fire doors
- Do not chock these doors open
- Do not obstruct or put any objects in the path of these doors

# **SMOKE DOORS/SCREENS**

- Smoke doors close in the event of an alarm
- They can still be opened in order to pass through for evacuation
- There will be a green button nearby that will open them



#### FIRE & EMERGENCY UTILITIES



- A. Door signage
- B. Break Glass Alarm
  - 1. Emergency (WIP cabinets only triggers evacuation)
  - 2. Emergency Door Release (corridors)
- C. WIP (Wireless Intercom Phone)
- D. Fire Hose Reel (water)

# REPORT HAZARDS, ACCIDENT & INCIDENTS

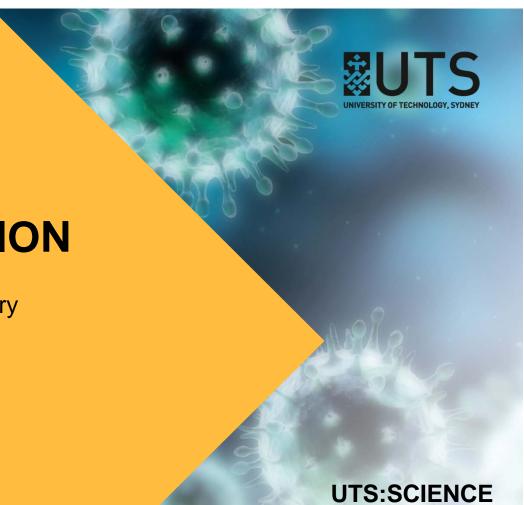
https://www.uts.edu.au/about/safety-and-wellbeing/reacting-hazard-accident-or-incident/reporting-hazards-and-incidents

- Report any hazard, accident or incident online using HIRO within 24 hours
  - Hazard and Incident Reporting Online
  - Staff/Student ID login
  - Visitors and volunteers need staff to log on their behalf
- Tutorial introduction to HIRO on website
- Check that HIRO report is submitted to appropriate supervisor or manager
  - PhD students Supervisor is default
  - Honours students use search function to identify supervisor

#### **First Aid**

- First Aid Officers (selected Science staff)
  - Trained and accredited
  - Identified on "Hazard Information" posters
  - First Aid Boxes (responsibility of First Aid Officers)
- Security all officers are first-aid trained
  - Dial "6"
- University Health Service
  - Tower Building, Level 6 Ph: 9514 1177
  - Hours MON-THU 8:30AM 6:00PM, FRI 8:30AM 5:00PM





**SCIENCE INDUCTION** 

**Module 02:** Safety in the Laboratory

UTS CRICOS PROVIDER CODE: 00099F

#### SAFETY AND YOUR RESPONSIBILITIES

- You have a duty of care to:
  - Yourself
  - Your colleagues
  - To follow all directions to maintain a safe working environment

https://www.uts.edu.au/about/safety-and-wellbeing/health-and-safety-management/responsibilities

#### **HAZARD AND RISKS**

#### What is a Hazard, what is a Risk?

- **Hazard**: something that can *cause harm* to you or to the environment
- Risk: the likelihood and consequence of the hazard affecting you or the environment

#### **HAZARD VS RISK - PRACTICAL ILLUSTRATION**





Work Activity = Install a car battery. What are the hazards?

#### **HAZARD VS RISK – PRACTICAL ILLUSTRATION**





**Hazards**: Corrosive, Explosive, Environmental (Pb) = HIGH. What is the risk?

Risk: LOW as hazards are well controlled (enclosed)

Risk can change by introduction of other hazards, e.g. jumper leads (electrical charging cables)

# COMMON HAZARDS IN THE RESEARCH ENVIRONMENT

- Research can involve exposure to several types of hazards, including:
  - Chemical
  - Biological
  - Electrical
  - Manual Handling
  - Plant and Equipment

We can reduce the risk associated with these hazards by considering how to safely perform these activities before we do them.

#### **RISK ASSESSMENT**

# A Risk Assessment (RA) is a document that identifies sensible measures to control the risks in your research activities

#### Research activity

- Every new activity or project must have a risk assessment performed before it is commenced. The risk assessment must:
  - Define activity
  - Identify Hazards
  - Identify Controls
  - Estimate Level of Risk

#### **ESTIMATING THE LEVEL OF RISK**

#### Take into account

- Consequence: the severity of harm
- Likelihood: the chance of an incident

Consequence (or seriousness) that may be:	Likelihood (or chance) that may be:
Insignificant: Non-injury incident. Minor effects on biological or physical environment.	Almost certain: The event will occur on an annual basis.
<b>Minor</b> : Injury or ill health requiring first aid. Moderate, short-term effects but not affecting ecosystem functions	<b>Likely:</b> The event has occurred several times or more in your career.
Moderate: Injury or ill health requiring medical attention. Serious medium-term environmental effects	<b>Possible:</b> The event might occur once in your career.
<b>Major</b> : Injury or ill health requiring hospital admission. Very serious long term impairment of ecosystem functions.	<b>Unlikely:</b> The event does occur somewhere from time to time.
Catastrophic: Fatality or permanent disabling injury. Very serious long term impairment of ecosystem functions.	Rare: Heard of something like this occurring elsewhere.

# **RISK MATRIX**

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	High risk	High risk	Extreme risk	Extreme risk	Extreme risk
Likely	Medium risk	High risk	High risk	Extreme risk	Extreme risk
Possible	Low risk	Medium risk	High risk	Extreme risk	Extreme risk
Unlikely	Low risk	Low risk	Medium risk	High risk	Extreme risk
Rare	Low risk	Low risk	Medium risk	High risk	High risk

#### **RISK ASSESSMENT FORMS**

https://www.uts.edu.au/about/safety-and-wellbeing/health-and-safety-management/risk-management

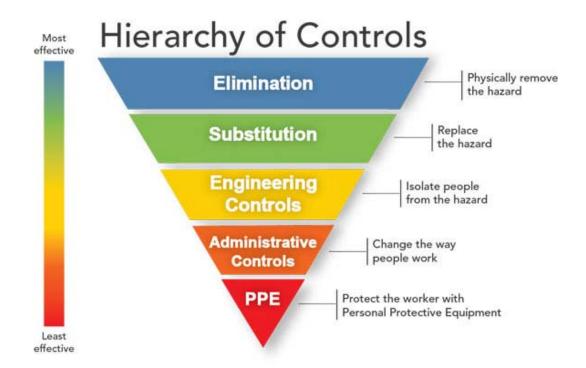
This website shows the following:

- How to perform a risk assessment (RA)
  - ALL activities must be risk assessed for safety
  - Changes in activities or location must be re-assessed
- Template for general risk assessment, safe work method statement (SWMS) – SWMS required for greater than low risk activities
- Link to online risk register (ORR)
  - This has pre-existing risk assessments for facility activities/equipment
- Your supervisor must approve your risk assessment before you undertake the activity

#### **HIGH RISK ACTIVITIES**

- Activities assessed as High or Extreme Risk must NOT be undertaken
  - Consult with your supervisor
  - Eliminate activity if possible
  - Substitute highly rated hazard with a lower rated hazard
  - Implement more controls for example a SWMS
- Safe work method statement (SWMS)
  - Outlines the steps to perform the activity that must be referred to each time the activity is performed
  - Lists steps that must NEVER be performed and all steps that MUST be performed to ensure the safety of the activity
  - Must also be approved by your supervisor

## **HIERARCHY OF CONTROLS**



#### **TYPICAL CONTROLS**

- Eliminate
  - ✓ Change method
- Substitute
  - ✓ Use a less hazardous chemical or lower risk equipment
- Engineering
  - ✓ Fume cupboards, biosafety cabinets, shielding, ventilation, exhaust
- Administration
  - ✓ Induction, training, safety data sheets, risk assessments, standard operating procedures (SOPs), emergency shutdown
- Personal protective equipment (PPE)
  - ✓ Footwear, lab coat, safety glasses, gloves



#### CHEMICAL HAZARDS

Read the Safety and Wellbeing website to understand your legal requirements regarding chemical safety.

https://www.uts.edu.au/about/safety-and-wellbeing/preventing-injury-and-illness/hazard-management/chemical

- Chemical risk assessment template
- Online chemical inventory database (OCID)
- Labelling template
- Safety data sheets (SDS) and where to get them
  - Chemical manufacturers
  - Chemwatch

#### **CHEMICAL HAZARDS**

Is a chemical hazardous?



Refer to Safety Data Sheet (SDS) from Manufacturer (preferred) or Chemwatch



Look for "Hazard statement(s)"

#### SIGMA-ALDRICH

sigma-aldrich.com SAFETY DATA SHEET

Revision Date 24.07.2015

Print Date 24.07.2016

Version 5.4

IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product identifiers Product name

Benzene

319953 Product Number Brand Sigma-Aldrich

1.2 Other means of identification

No data available

1.3 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.4 Details of the supplier of the safety data sheet

Sigma-Aldrich Pty. Ltd. Company

12 Anella Avenue CASTLE HILL NSW 2154

AUSTRALIA

+61 2 9841 0555 (1800 800 097) Telephone +61 2 9841 0500 (1800 800 096)

1.5 Emergency telephone number

Free call (24/7): 1800 448 465 Emergency Phone #

: +44 (0) 8701 906777 Int'l (24/7)

HAZARDS IDENTIFICATION

**GHS** Classification

Flammable liquids (Category 2)

Skin corrosion/irritation (Category 2) Serious eye damage/eye irritation (Category 2)

Germ cell mutagenicity (Category 1B)

Carcinogenicity (Category 1A) Aspiration hazard (Category 1)

Specific target organ toxicity - repeated exposure (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word

Hazard statement(s)

Highly flammable liquid and vapour. May be fatal if swallowed and enters airways.

Causes skin irritation.

H315 Sigma-Aldrich - 319953

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# **SAFETY DATA SHEETS (SDS)**

#### The SDS identifies:

- The hazardous nature of the substance (e.g. flammable, toxic, corrosive)
- Control measures
  - PPE required
  - Storage requirements
- First aid
- Spill containment
- Fire fighting
- Physico-chemical properties
- Must be easily accessible in the area it is used or stored

# **GLOBALLY HARMONISED SYSTEM (GHS)**

The new Globally Harmonized System of Classification and Labelling of Chemicals (GHS) is the new standard from the beginning of 2017.

More information is available from:

http://www.safeworkaustralia.gov.au/sites/swa/whs-information/hazardous-chemicals/pages/hazardous-chemicals-other-substances

## **GHS SYMBOLS**



Exploding bomb Explosives



Flame Flammables



Flame over circle Oxidisers



Gas cylinder
Gases under
pressure



Corrosion Corrosives



Skull and crossbones
Acute toxicity



Environment
Environmental
hazard



Exclamation mark
Harmful/irritant
Harmful to
ozone layer



Health hazard
Severe health
hazards

# **CHEMICAL RISK ASSESSMENT (CRA)**

- Required for any chemical that is hazardous
  - Consult SDS!
- Copy of the CRA must be located in the laboratory where the chemical is to be used or stored
- A register is kept of all chemicals on OCID
- <u>www.ocid.uts.edu.au</u> (Login = Science, Password = mango)
   (UTS internal access only)
- The Laboratory Manager must be advised when chemical arrives

#### CHEMICAL LABELS

All chemical containers not in immediate use (e.g. stored >12 hr) must be labelled with:

- (A) Chemical name
- (B) Date
- (C) Your name
- (D) Risk and Safety Phrases
- (E) Expiry date
- (F) Obtain label from lab (if available) or make your own and attach
  - http://safetyapp.adsroot.uts.edu.au/label/ghs.php
     (UTS internal access only)

#### **CHEMICAL STORAGE**

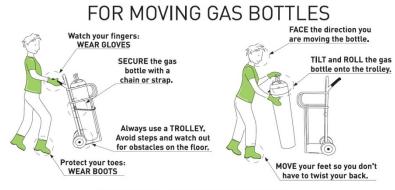
## No incompatible chemicals stored together

- Flammables must be stored in flammable cabinets only
- Flammables must NOT be stored in domestic fridges
- Oxidising agents and corrosives away from flammables
- Fume hoods are not for storage
- Label original chemical bottles with the owner's name and date opened
- If there are multiple hazard symbols, store according to first symbol



## **COMPRESSED GASES**

- Must be appropriately secured at all times
- Not stored must be in use
- Training required for changing and handling
- Segregation according to DG class
- Backflash arrestors for fuel (e.g. hydrogen gas)



Secure cylinders to a fixed object when not in use.

#### **CHEMICAL SAFETY**

#### Chemical waste streams

- Talk to your lab manager to see how chemical waste is organised in your area before you start working
- Hazardous liquid waste is categorised as;
  - Halogenated hydrocarbons (CI, F, Br, I)
  - Non-halogenated hydrocarbons
  - Aqueous metal salts
- Solid or other waste should be clearly labelled with type of waste and chemical names



#### CHEMICAL SAFETY

#### Cryogenic liquids

- Most commonly used are liquid nitrogen (LN<sub>2</sub>), liquid helium (LHe)
- Training required before use
- Wear appropriate PPE
  - Gloves
  - Face shield
  - Covered footwear
- Consider transport around the buildings. A maximum of 2L is permitted in lifts with people
- Oxygen depletion alarms may be required if used in confined spaces

#### **CHEMICAL SAFETY**



#### Spill kits

- Talk to your lab manager to find out where spill kits are located in your area
- Use for small liquid spills only
- Get help for larger or very hazardous spills (lab staff or dial 6 for emergency)
  - Evacuate local area around spill
  - Post signage indicating danger if possible

#### **BIOLOGICAL HAZARDS**

Read the Safety and Wellbeing website to understand your requirements when working with or around microbiological hazards, communicable diseases, sharps, GMOs and Quarantine samples.

https://www.uts.edu.au/about/safety-and-wellbeing/preventing-injury-and-illness/hazard-management/microbiological

https://www.uts.edu.au/about/safety-and-wellbeing/preventing-injury-and-illness/hazard-management/communicable-diseases

https://www.uts.edu.au/about/safety-and-wellbeing/preventing-injury-and-illness/hazard-management/sharps-and-needlestick

#### **BIOLOGICAL HAZARDS**

#### Biological hazards may include the following:

- Microorganisms
  - Pathogens, infectious agents
- Pathology samples
  - Blood fractions, tissues
- Soil, Earth, Vegetation
  - Skin sensitivities, spores
- Genetically Manipulated Organisms (GMOs)
- Approved Arrangement Material



#### **CONTROL OF BIOLOGICAL HAZARDS**

# The use of some biological samples is regulated by various legislation, standards and codes

- GMOs Gene Technology Act 2000
- Imported samples Biosecurity Act 2015
- Pathogens AS/NS 2243.3:2002 Safety in laboratories Microbiology

#### **CONTROL OF BIOLOGICAL HAZARDS**

High risk biological hazards require pre-approval from the UTS Biosafety Committee. These include all experiments using one or more of the following:

- GMOs
- Pathogens
- Cytotoxins
- Radiation

All individuals must be included on the approval before they commence work using any of the above.

# TYPES OF CONTROL FOR BIOLOGICAL HAZARDS

#### Containment

- Biological Safety Cabinets
- PPE gloves, safety glasses, footwear, lab coats
- Decontamination and spill procedures

#### Other Measures

- Restricted access
- Immunisation (e.g. hepatitis B, tetanus)

### **PHYSICAL CONTAINMENT 2 (PC2)**

This signage indicates that the laboratory has been certified for work with pathogens or GMOs



All persons working in an PC2 lab must have completed a local area induction for PC2 and comply with the OGTR and Biosafety committee regulations

Speak to the facility manager before entering this lab.



## **APPROVED ARRANGEMENTS (AA)**

This signage indicates that the laboratory has been certified for work with imported samples / goods

All persons working in an AA must comply with the Biosecurity regulations

Speak to the facility manager before entering this lab.

# QUARANTINE AREA

NO ENTRY OR REMOVAL OF GOODS
AUTHORISED PERSONNEL ONLY

HEAVY PENALTIES APPLY
OUARANTINE ACT 1908

#### SHARPS AND NEEDLES

- Sharps include all syringe needles, scalpel blades, razor blades etc.
- If you experience a needle stick injury, obtain medical attention immediately (dial 6) and lodge a HIRO report.
- Do NOT re-sheath needles after use
- Use yellow medical sharps waste containers for needles and sharps
  - Put sharp end in first
  - Do NOT overfill container
  - Never place sharps directly into the yellow clinical waste bins
- Pipette tips are also considered as sharps
  - Dispose of tips in provided marked containers



#### **OTHER CLINICAL WASTE**

All waste at UTS is hand sorted.

Do not place any items that look "medical" in the general waste.

Use the yellow clinical waste bins or other bins provided; consult your lab manager.

This includes syringe barrels that have only been used to dispense water, samples or solutions.



#### **WASTE MANAGEMENT**

- Each research facility will have local arrangements for managing different waste streams
  - Please consult the lab manager for the protocols used in each specific area
- All labs have red bins for the disposal of broken glass
  - Ensure that NO GLASSWARE is disposed of in general waste bins
- A glassware washing and lab coat laundering service is offered in most labs
  - Consult your lab manager for information about local arrangements

#### **ELECTRICAL SAFETY**

Read the Safety and wellbeing website to understand your requirements when working with electrical appliances

https://www.uts.edu.au/about/safety-and-wellbeing/preventing-injury-and-illness/hazard-management/electrical

#### **ELECTRICAL SAFETY - PAT**



- Most labs and field sites are "hostile operating environments", so all portable appliances must be tested for earth leakage (or residual current)
- Look for PAT (portable appliance testing) tag on power cord and electrical appliance to indicate test has been performed
- Check that tag date is not beyond expiry date
- Never use appliance with red "Danger: Do Not Operate" tag
- Any electrical appliances brought in from an external source MUST be PAT approved at UTS prior to use

#### MANUAL HANDLING

Read the Safety and Wellbeing website to understand your requirements before undertaking any manual handling activities or tasks

https://www.uts.edu.au/about/safety-and-wellbeing/preventing-injury-and-illness/hazard-management/manual-handling

#### **MANUAL HANDLING: LIFTING**

- 15-20 kg max
- Use lifting aids
- Don't lift away from body/ straight back/no twisting while lifting
- Lift in smaller units if possible
- Ensure heavy objects are not stored above shoulder height
- Use trolleys for transport (available from Science Store)
- Take note of "Tips for Manual Handling" poster
- All heavy equipment that cannot be moved by pallet jack must be moved by a professional mover
- Manual Handling training is available through Safety and Wellbeing



#### PLANT AND EQUIPMENT

Read the Safety and Wellbeing website to understand your requirements before undertaking any activities with plant and/or equipment

https://www.uts.edu.au/about/safety-and-wellbeing/preventing-injury-and-illness/hazard-management/plant-and-equipment

https://www.uts.edu.au/about/safety-and-wellbeing/preventing-injury-and-illness/hazard-management/noise

#### PLANT AND EQUIPMENT

- Care with Laboratory Equipment / Instrumentation that has:
  - Moving parts
  - Electrical hazards especially if outer casing removed
  - Noise ear plugs
  - Heat production thermal gloves
  - Heavy to move (suction pads)
  - Radiation, UV, laser eye and skin protection
- Read Standard Operating Procedures
- Take note of Warning Signage
- Training is required for hazardous plant and equipment ask your Lab Manager

#### AFTER-HOURS WORK

- Should be considered as part of a risk assessment for the activity
- Avoid high-risk work outside of regular hours
- Your supervisor must approve of plans for after-hours work in the laboratory or field
- Place signage on A/H work in progress with your contact number
- Arrange to couple work times with colleagues
- Security constraints: swipe access restrictions evening & weekends
- Room lighting may require manual resetting
- Same considerations should be made when working in isolation e.g.
   Level 0, Building 7 no mobile coverage and limited visibility
- Guideline on a/h and working in isolation will be released shortly

#### **BUILDING SERVICES**

- The building infrastructure is managed by Building Services, for example plumbing, electrical, air-conditioning, gas, etc.
- Dial "6" for emergency
- Contact Building Supervisor (Buildings 4 and 7), Rod Hahn or Building Services branch directly for urgent problems
- Complete Building Services website form for general faults and cleaning issues
  - http://www.uts.edu.au/about/maps-and-facilities/facilitiesmanagement/maintenance-and-cleaning
  - See Lab Manager for further information if required

#### **EMERGENCY INFRASTRUCTURE IN LABS**

- Safety shower and eyewash stations are available in case of emergencies
- Ceiling sprinkler system and smoke detectors
- Fire fighting equipment:
  - Fire extinguishers (CO<sub>2</sub>)
  - Fire blankets
  - Fire hoses
- Do not obstruct these services!



#### **EMERGENCY GAS & POWER ISOLATION**





- The emergency stop buttons will cut the power or gas to the entire lab
- You must advise staff if these are activated, intentionally or accidentally!

### **GENERAL RULES IN THE LABORATORY**

The DON'Ts	The DOs
No eating	Follow all signs and instructions
<ul><li>No drinking</li><li>This includes closed bottles!</li></ul>	Wear lab coat, safety glasses and any other PPE required
No smoking	Wear solid and closed-in footwear
No samples in public areas	Remove gloves and lab coat when moving from lab to public areas
	Wash hands before leaving lab

# **GLOVES OFF**





#### HAZARD INFORMATION POSTERS

All lab entry doors have a hazard information poster.

- Warn of likely hazards in the lab
- Precautionary measures required by lab users
- First Aid Officer information
- Building Services contact details
- Location of eye wash and safety showers



#### **ONLINE RESOURCES**

- Faculty Health & Safety Portal outlines responsibilities:
  - <a href="http://www.uts.edu.au/about/faculty-science/what-we-do/facilities/health-and-safety-portal/">http://www.uts.edu.au/about/faculty-science/what-we-do/facilities/health-and-safety-portal/</a>

Faculty of Science Health and Safety Plan 2016-2018 is available on the Online Management System:

- <a href="http://www.oms.uts.edu.au/">http://www.oms.uts.edu.au/</a> (UTS internal access only)
- Safety and Wellbeing website:
- https://www.uts.edu.au/about/safety-and-wellbeing/safety-and-wellbeing-uts

#### RESEARCH RISK MANAGEMENT PLAN

- All lab users MUST have a Risk Management Plan (RMP)
  - Traditional Risk Management Plan found at:
  - <a href="https://www.uts.edu.au/about/safety-and-wellbeing/preventing-injury-and-illness/safety-topics/research">https://www.uts.edu.au/about/safety-and-wellbeing/preventing-injury-and-illness/safety-topics/research</a>
- This document includes a register of ALL the risk assessments relevant to your project
- Must be developed with your supervisor
  - All people involved in the project must be consulted and sign the document
  - Consult all relevant facility managers
- Is approved by Head of School / Institute Director and Associate Dean (Research)
- Must be revised annually

#### WHERE TO FROM HERE?

- ✓ Complete Science Research Induction Assessment
- √ Complete RMP
- ✓ Register for access to the research facilities and undertake local area induction contact relevant lab managers
- ✓ When complete, your supervisor requests your swipe / key box access
  by going here:

http://www.uts.edu.au/about/faculty-science/what-we-do/our-facilities/security-access-science-and-graduate-school-health#request-access

- ✓ Get a Laboratory Notebook
  - ✓ Staff: <a href="http://surveys.uts.edu.au/index.cfm?surveyid=860">http://surveys.uts.edu.au/index.cfm?surveyid=860</a>
  - ✓ Students: http://surveys.uts.edu.au/index.cfm?surveyid=859

#### **COMPETENCY ASSESSMENT - STAFF**

- You need to complete the Faculty of Science Research Lab Induction Assessment Online by:
  - Log in to Neo (you must use Chrome or Firefox, not IE)
  - Go to Employee Self Service
  - Online Learning Management
  - My Learning
  - Click on Induction under Browse Catalogue on the right hand side of the screen
  - Enrol in class
  - Press play
- Once you have passed you can contact the relevant Research Laboratory Manager to arrange a local area induction

#### **COMPETENCY ASSESSMENT - STUDENTS**

- Contact a Research Laboratory Manager to request access to the assessment module – provide your student number
  - Log in to UTSOnline <a href="https://online.uts.edu.au">https://online.uts.edu.au</a>
  - Click on Science Research Laboratory Induction under Communities
  - Click on Content on the left hand side of the screen
  - Select Science Induction Assessment
  - Once you have passed you can contact the relevant Research Laboratory Manager to arrange a local area induction

#### **COMPETENCY ASSESSMENT - EXTERNAL**

- If you are an external visitor and do not have a UTS staff or student number, you must contact your Research Lab Manager to arrange a time for a paper-based assessment
- Once you have passed you can contact the relevant Research Laboratory Manager to arrange a local area induction

#### **RESEARCH LAB KEY CONTACTS**

Bioscience Research Mercedes Ballesteros

Chemical Technology Research Ronald Shimmon

Environmental Science Research Gemma Armstrong

ERNST Facility Fiona Ryan

Physics Research / MAU Katie McBean