UNIVERSITY OF
KWAZULU-NATAL

INYUVESI
YAKWAZULU-NATALI

SCHOOL OF ENGINEERING

Your Commitment to Health and Safety in the Workplace

SCHOOL OF ENGINEERING
MY COMMITMENT TO HEALTH AND SAFETY

I hereby acknowledge that I have read, understood and signed acceptance of the instructions and terms written hereunder, and commit myself to full compliance with them in the interest of promoting healthy and safe practice.

1. I shall obey all Rules and Regulations pertaining to the Laboratory, Workshop or Site that I am working in;
2. I shall comply with any lawful and reasonable instruction given to me by my supervisor, manager or host while working in a Laboratory, Workshop or on site;
3. I shall **not** tamper with or attempt to handle machinery, equipment or materials that I have not been officially trained and authorised to use;
4. I shall **not** use machinery, equipment or materials in any way that may cause harm, damage or loss to myself, others or University property;
5. I shall **not** permit any unauthorised person to use machinery, equipment or materials on my behalf.

(Note: For the purposes of this Commitment, 'employees' as referred to above include students and visitors)

Extract from the OCCUPATIONAL HEALTH AND SAFETY ACT (No.85 of 1993):

14. GENERAL DUTIES OF EMPLOYEES AT WORK

Every employee shall at work –

(a) Take reasonable care for the health and safety of himself and of other persons who may be affected by his acts or omissions;

(b) As regards any duty or requirement imposed on his employer or any other person by this Act, co-operate with such employer or person to enable that duty or requirement to be performed or complied with;

(c) Carry out any lawful order given to him, and obey the health and safety rules and procedures laid down by his employer or anyone authorised thereto by his employer;

(d) If any situation which is unsafe or unhealthy comes to his attention, as soon as practicable report such situation to his employer or to the health and safety representative for his workplace who shall report it to the employer; and

(e) If he is involved in any incident which may affect his health or has injured himself, report such incident to his employer or to anyone authorised by the employer, or to his health and safety representative, not later than the end of the particular shift during which the incident occurred, unless the circumstances were such that reporting the incident was not possible, in which case he shall report the incident as soon as practicable.

15. DUTY NOT TO INTERFERE WITH OR MISUSE THINGS

No person shall intentionally or recklessly interfere with, damage or misuse anything which is provided in the interest of health or safety.

FAILURE TO OBEY HEALTH AND SAFETY REGULATIONS WILL RESULT IN PROSECUTION TO THE GREATEST EXTENT OF THE LAW

SCHOOL OF ENGINEERING
COMMITMENT TO HEALTH AND SAFETY

I, _____ (print full name),

Student/Staff Number (or Visitor's ID) : _____ ,
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Signature: _____Date:_____

This form must be filled in and signed annually by every student or visitor assigned to work in Laboratories, Workshops or Sites relevant to their studies, projects or research in the University of KwaZulu-Natal. These forms must be retained for a period of 5 years. (Dean's Instruction, Feb 2012)

←CUT ON DOTTED LINE. SUPERVISOR'S COPY FOR RECORDS/AUDIT

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SUMMARY OF GENERAL SAFE PRACTICE

Read and comply with these basic safety regulations governing persons in the workplace under the auspices of the Occupational Health and Safety Act No. 85 of 1993. There are also specific safety procedures for various areas.

ENGINEERING LABORATORIES, WORKSHOPS AND WORK SITES
BEWARE: YOU ARE ENTERING A HAZARDOUS ENVIRONMENT

Hazard **- Any physical situation with the potential to cause harm.**
Hazardous Agent **- Any physical, chemical, radioactive, or biological agent or substance which may cause harm to those exposed.**

PREVENTION IS BETTER THAN CURE

The primary motive for all safety regulations, procedures and rules is to prevent injuries and accidents. Although every effort is made to ensure the safety of all in the School, accidents can happen.

Generally, equipment, machines and materials are only as safe as the person who is using it. Personal safety thus depends on a high level of individual safety-consciousness and an informed approach to safety issues.

Overconfidence and bad attitudes can also lead to accidents. Examine your attitudes to the tasks you perform: Do you have unsafe habits or procedures? Do you think "*it will never happen to me*"?

It is in YOUR best interests to improve the safety of the School and your own particular workplace to avoid you -or someone else- becoming an "accident statistic".

GENERAL HAZARDS

Hazards to people and property abound in everyday life, and are often so obvious that they become "invisible".

Commonplace hazards account for more accidents than the recognised dangerous aspects of the School. You should always be aware of one's immediate environment and look out for potential hazards.

RESPONSIBILITY

It is YOUR responsibility to immediately report any apparent unsafe condition to the responsible member of staff or safety representative.

IF IT LOOKS UNSAFE, REPORT IT! YOU MAY SAVE A LIFE

DRUGS AND ALCOHOL

No person under the influence of alcohol or narcotic substances will be allowed on the premises.

EATING, DRINKING AND SMOKING

Eating, drinking and smoking is NOT permitted in Laboratories or Workshops.

FOOLING AROUND

No horseplay or reckless, unsafe behaviour will be tolerated in laboratories, workshops or work sites.

LOOSE ITEMS AND BAGS

Bags or other loose items should not be brought into a workshop or laboratory as people can trip over them. Working areas must be kept in a neat and orderly condition as this prevents accidents. Always be patient, never rush in the workshop.

LIFTING HEAVY OBJECTS

Do not bend over any heavy or large objects when lifting, as this will strain the back. Bend the knees and grasp the object, straighten the legs to lift the object off the ground. The leg muscles are the strongest group of muscles in the body and one will not damage them as easily as the back muscles.

FOOTWARE

Only safety shoes or safety boots are permitted in Engineering Laboratories and Workshops.
Sandals, takkies and open shoes are prohibited in Engineering Laboratories and Workshops.

HAIR AND PERSONAL CLOTHING

In workshops with rotating machinery, loose clothing is not permitted. Long hair must be tied back.

PROTECTIVE CLOTHING (PPE)

All protective clothing and equipment must be continuously worn in laboratories and workshops where and when required. This includes safety goggles, face shields, ear protection, dust or gas masks, helmets, etc.

HOUSEKEEPING

Always work in a neat, orderly manner. Ensure that the bench tops are always tidy and free of clutter as this allows for a safe and efficient worktop. The passageways, emergency exits, emergency equipment, electrical panels, etc. must be free from any obstacles at all times. Any tubing or cables must be properly located out of harm's way.

FALLS

Falls can be prevented.

- Always use handrails when using stairs.
- Use caution when walking on surfaces which contain oil, water or other adverse or unstable material or condition.
- Immediately clean up spills.
- Prevent fall hazards by keeping stairs, walkways, aisles and walk areas clear of boxes, loose materials, wires and other objects.
- Select shoes for comfort and safety that are compatible with your work environment.
- Do not stand or climb on a desk, chair, or other unstable surface to reach for an object. Use a ladder.

WORKING ALONE

No person is permitted to work alone in a laboratory or workshop alone **without prior written authorisation**.

IF IN DOUBT, ASK!

RISK ASSESSMENTS AND SAFE OPERATING PROCEDURES

- Supervisors of students engaged on experiment work must carry out formal Risk Assessments and draw up Safe Operating Procedures (SOP) which must be approved by the discipline Academic Leader and Safety Representative.
- The supervisor must provide instruction, training and supervision to ensure, as far as reasonably practical, the health and safety of students and persons who may be affected by work. Risks must be regularly re-assessed.
- Acquaint yourself with the Standard Operating Procedures (SOPs) and safety risks associated with your laboratory/workshop equipment, materials and experimental work.
- Do not use a machine if you have not been shown how to operate it safely by the instructor. Always use a guard when working on a machine. Keep hands away from moving/rotating machinery. Use hand tools carefully, keeping both hands behind the cutting edge.
- You must ensure that you have been taught how to operate the equipment. Listen carefully to the demonstrators and follow instructions.

- Be familiar with fire drill and evacuation procedures. Know the location and use of emergency equipment such as: fire alarms/extinguishers, eye-wash stations/bottles, emergency shower, electrical plug/fuse box for your equipment, closest first aid box.

INCIDENTS, ACCIDENTS AND INJURIES: FIRST AID AND REPORTING

An accident is any event which causes damage to people and property. **Every accident, "near-miss" or equipment failure which could have caused an accident must be reported to the discipline's Safety Officer immediately.**

A NEAR MISS IS A WARNING TO BE TAKEN SERIOUSLY

Obviously the seriousness of these accidents will vary, the worst being injury to people, and the least being inexpensive damage to repairable/replaceable items.

First Aid is the immediate emergency treatment provided for injury or sudden illness before professional medical care is available. Never minimize the seriousness of an injury or illness. If in doubt, seek medical attention. There are trained First-Aid staff in all Engineering areas. Their names and locations are listed on signage around the building.

DO NOT ATTEMPT TO RENDER FIRST AID UNLESS YOU KNOW WHAT YOU ARE DOING OTHERWISE INJURIES MAY BE AGGRAVATED.

IF YOU DON'T KNOW WHAT TO DO, CALL FOR HELP

FIRE PREVENTION

Know the emergency plan for your work area.

- You have a personal responsibility in the prevention and control of fires. Familiarize yourself with the location of fire equipment in the area where you work and the proper method of turning in a fire alarm. If you are to use portable fire protection equipment (such as fire extinguishers), you must be trained in the use of portable fire protection equipment and updated as necessary.
- Obey all rules, regulations and signs for fire safety such as those controlling smoking, open flames and other sources of ignition and those controlling the storage, handing and use of flammable liquids or other hazardous materials.
- Flammable liquid shall be handled and stored in approved safety containers equipped with flame arrestors and spring actuated caps.
- Do not store acids and bases or oxidizers and reducers in the same cabinets due to the possibility of extremely violent reaction between the two.
- Store all poisons separately.
- Keep hand-operated fire equipment such as extinguishers, hoses, etc., fully accessible, mounted and unobstructed at all times.
- If you use a fire extinguisher or any other fire equipment, notify your supervisor at once so that it can be immediately replaced and serviced.
- If your clothing catches fire, smother the flame by rolling on the floor or ground. Never run, as this could cause the flames to spread.
- Do not clean clothing with gasoline, solvents or other flammable gasses or liquid. A spark may ignite your clothing.
- Do not use oil or grease on any oxygen equipment such as cylinders. Oxygen under pressure unites with oil and grease with explosive violence.

FIRE EXTINGUISHERS

Know the location and operation of the fire extinguishers and fire alarms closest to your work station. The particular application of these extinguishers (electrical fire, chemical fire etc.) is also important.

Dry chemical extinguishers (**Blue** label) particularly effective on flammable liquids, but may be used on any kind of fire.

Water extinguishers (**Red** label) useful on rubbish or paper fires but should NOT be used on burning metals or electrical fires.

Carbon dioxide extinguishers (**Black** label) useful for most fires EXCEPT those involving alkali metals and their oxides or peroxides (use soda ash).

- For a small, contained blaze, e.g. in a beaker, it is effective to cut off the oxygen supply by sealing the container. For electrical fires, remember to switch off the current before proceeding to dose the flames.
- It is important to attack a fire as soon as possible after it has started. The longer the fire burns the more difficult it is to extinguish.
- When a fire has already got out of control and the building/area is being evacuated, try to remember to close doors and windows to contain the blaze.

IN THE CASE OF A FIRE

Upon detecting a fire or smoke, proceed immediately to the nearest break glass unit which is normally situated at the entrance of any building and break the glass. This will activate an alarm in both the building you are in and the main console in the Risk Management Services duty room.
AND
Contact Risk Management Services (RMS) by dialing extension **3777 or 2540** to inform them of the situation. (**031-260-3777** or **031-260-2540**)

RMS will call the Emergency services immediately.

If you are unable to contact RMS, you may contact the Emergency Services yourself on **361-0000 or 10177**

If there are two or more of you who discover the fire, one person should raise the alarm whilst the remainder may endeavour to extinguish the fire with available fire fighting equipment.

On the activation of the fire alarm all staff, students, visitors and contractors, other than Emergency teams are to report to their respective Assembly Areas. **NO** person should re-enter the building until given the **"ALL CLEAR"** by the senior person in charge of the Emergency Services.

THE FIRE AND EVACUATION ALARM IS A CONTINOUS BELL/SIREN SOUND

EVACUATION

An evacuation of a building will always be ordered where there is any possibility of danger to human life.

In the unlikely event of a fire or other emergency necessitating an evacuation of the premises the following guidelines should be observed.

- When notified by the sounding of the alarm, or instructed by the Evacuation Marshall or the Head of Department, leave the building immediately do not ask questions. **STAY CALM.**
- Proceed to the nearest emergency exit and leave the building through the shortest predetermined route.
- Escape routes are indicated by the escape symbolic signs.
- If you are aware of any disabled persons in the area, bring it to the attention of the person in charge or assist that person to safety.
- DO NOT stop to search for friends, the fastest way for them to be located is for everyone to proceed to the assembly point.
- **DO NOT GO BACK INTO THE BUILDING**
- **DO NOT RUN** – Move at a steady rate in a downward movement.

- **DO NOT USE LIFTS** – You could get trapped
- **DO NOT TALK UNNECESSARILY** – As you may miss vital instructions
- Follow instructions from the persons in charge of your department.
- Take only personal belongings, ensuring that you leave one arm free
- Close all windows and the last person out of each room, close the door.
- Remain at the Assembly point where a role call will be taken.

WORKING WITH MACHINERY AND MECHANICAL APPARATUS

MACHINERY OPERATION STANDING INSTRUCTIONS

- The employer is required by law to provide various safety devices in connection with machinery
- Loose outer clothing must not be worn by persons working near moving machinery and persons with long hair must wear caps or nets to confine the hair.
- Unless there is a special apparatus approved by the Inspector, driving belts must not be unshipped whilst machinery is in motion.
- Machinery in motion must not be cleaned, repaired, adjusted or oiled except in special cases, and then it may be done by an authorized competent person only.
- No person other than an authorized competent person shall trespass within the fences of machinery in motion. Any occurrence liable to cause danger to persons must be reported immediately to your supervisor. .
- No person operating machinery shall depute any other person to do his work and no other persons may operate such machinery except with the sanction of his official superior.
- Any person intending to start a machine will before doing so, satisfy himself that no other person is endangered.

EMERGENCY STOP/SHUTDOWN BUTTONS AND SWITCHES

- Know where the emergency stop buttons are positioned in the workshop where there are machines and similar equipment. You can use the emergency stop button to turn off all electrical power to machines.
- Do not misuse, damage or remove any equipment or appliance provided for health and safety in the school.
- No experimental work can be undertaken in the workshops or laboratories by undergraduates without the supervision of a demonstrator or a member of staff. For staff or postgraduate students, careful consideration should be given to the increased risk of working alone or without a person within hearing distance.

WORKING WITH ELECTRICAL EQUIPMENT, APPARATUS AND CABLES

ELECTRICAL HAZARDS

There are several guidelines for working with electrical equipment:

- You cannot ‘see’ electricity – you can only observe -or feel- its effects.
- Unqualified persons may not engage in electrical reticulation of mains voltages or greater.
- Inspect all equipment before use for damage to cables and plugs, and check for any moisture present. Refer any problems to the Electrical Technician or Safety Representative.
- When equipment is moved to a new location, make sure that the circuit can carry the extra load.
- DO NOT improvise connections between non-matching plugs.
- Where flammable or volatile substances are being handled, use caution with electrical equipment such as heater thermostats or stirrer motors.
- Consider the effect of possible static charge build-up on certain equipment when dealing with flammable materials.

WORKING WITH GASES AND CHEMICAL SUBSTANCES

GENERAL LABORATORY PRACTICE

Aim to avoid emergencies by careful planning of your work in all stages:

- Choice of location
  - need for fumehoods (for toxic volatiles)
  - need for fire-fighting equipment, guards, signs, etc.
  - accessibility of controls (no obstruction by screens, hot pipes, etc.)
  - do not block passageways
- The materials of construction
  - resist corrosion
  - withstand heat/pressure etc.
  - correct choice of glassware
- Required safety protection, e.g. gloves, glasses, etc.
- Review the completed installation and make a "dummy" run to check procedures
- Dismantle equipment and discard all chemicals in the correct manner. Return all materials to their applicable stations. Consult Laboratory Technicians.

PROTECTIVE CLOTHING IS ESSENTIAL

- Correct clothing can often minimize injury in the event of a small accident. The wearing of protective clothing is required (e.g. laboratory coat, apron, overalls, glasses, gloves, etc.) where necessary, and safety shoes at all times.
- Safety shoes must be fully closed, acid resistant, steel-capped approved safety shoes. No open back/open front/semi closed shoes are allowed. Safety glasses, masks or face shields are available where necessary, as are gloves and ear-plugs for further protection.
- Protective clothing is also necessary in the event of an accident where there has been a wound which is bleeding. Anyone assisting an injured/bleeding person should wear gloves or other protective clothing to avoid coming into direct contact with the blood which might be infected. All blood spills should be considered infected and treated as such, with the areas being thoroughly cleansed and disinfected. Be aware of the threat of AIDS and possible infectious situations.

HOUSEKEEPING

- All chemicals and equipment must be neatly stored in its proper place after use.
- Glassware must be properly cleaned before returning to its place of storage.
- Glassware and apparatus that is chipped or broken may not be used.
- These must be removed immediately and either sent for repairs or disposed of in the proper manner.
- Spills must be cleaned up immediately.
- Bottles and containers must not be left open when they are not in use.
- Bunsen burners must not be left unattended with the flame burning.
- Do not remove any items from another person's work area or locker without their permission and **always leave the workplace clean and tidy for the next person to use.**

LABELLING OF GAS AND CHEMICAL CONTAINERS

Proper labeling forms a part of housekeeping. However, many people overlook the importance of labels thereby making it necessary to highlight its vital role in safety under its own heading. Any non-empty container MUST be clearly and fully labelled with a description of its contents. Even a flask of clean water must have a label!

GASES AND LIQUIDS UNDER PRESSURE

Permanent gases, oxygen, nitrogen, air, argon, helium, hydrogen, methane, etc. are supplied in high pressure cylinders. Numerous other gases are supplied as liquids under pressure. These include, ammonia, butane, carbon dioxide, carbon monoxide, chlorine, hydrogen chloride, propane, and sulphur dioxide. The pressure is dependant on the characteristics of the substance. In addition, the gases can be toxic and flammable. Cylinders

of flammable gases generally have valve outlets with left-hand threads, while non-flammable gases have right-hand threaded outlets.

STORAGE OF GAS CYLINDERS

Due to the large amount of energy associated with compressed gases, gas cylinders can be very dangerous. All cylinders must be stored in a vertical position at all times, except for cylinders designed to be horizontal, e.g. ammonia or chlorine. This is to keep any liquid present out of the valve, and to protect the sides of the cylinder from shocks. Cylinders must also be chained at any given time. If a cylinder of compressed gas falls over and the fitting snaps off, that cylinder will propel like a rocket and can go through concrete walls. The cylinders must always be stored and used in a cool well-ventilated area away from all ignition sources. Valve caps should always be kept in place to protect the valve from damage and accidental opening.

Cylinders containing noxious or toxic gases must be stored in a well-ventilated area, and ALL cylinders must be returned as soon as they become empty. These cylinders should be kept aside from full cylinders, be clearly marked and their valves closed.

CONFINED SPACES

The OSH. Act defines a confined space as a space that is large enough for an employee to enter or break the plane of entry, has restricted means of entry or exit, has unfavourable natural ventilation and is not designed for continuous employee occupancy.
Examples of confined spaces include, but are not limited to: tanks, tunnels, manholes, trenches, silos and vaults. Entry into confined space can be extremely dangerous. Possible hazards can include:

- Oxygen deficiency
- Fire, explosion hazards
- Exposure to dangerous vapours and toxics gases
- Physical hazards

RESPIRATORS

Respirators are used in an environment where there is insufficient oxygen to protect against harmful dusts, fogs, smokes, mists, gases, vapours and sprays. Simple respirators, e.g. dust masks, are often used when dust is being produced. A filter cartridge/canister type respirator is required in an area wherein low concentration toxic vapour is present.

LIST OF SAFETY REPRESENTATIVES, FIRE MARSHALLS AND FIRST AIDERS IN YOUR AREA:

ROLE	NAME	LOCATION	TELEPHONE

EMERGENCY NUMBERS:

RISK MANAGEMENT SERVICES (RMS)

031-260-2540 / 031-260-3777

If RMS is unavailable:

EMERGENCY SERVICES

031-10177 / 031-361-0000