

School of Mechanical and Manufacturing Engineering

Safety Statement

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1. Introduction

1. The purpose of the Safety, Health and Welfare at Work Act 2005, is to ensure the safety, health and welfare of all employees in the workplace. The Act applies to employees in all types of work and embraces all the activities of Dublin City University (DCU).
2. In compliance with the Act, the University has prepared a written Framework Safety Statement describing the employer arrangements and the employee co-operation necessary to achieve this purpose. In addition the Framework Safety Statement outlines the University's policies on occupational health and safety matters and defining the necessary management structure for the implementation of these policies. Specific health and safety issues of relevance to the University as a whole are detailed in this framework safety statement.
3. In compliance with the DCU Framework Safety Statement, the School of Mechanical and Manufacturing Engineering has prepared its own local safety statement, documenting its own hazards, risks, risk control protective and preventive measures and resources for ensuring a safe and healthy work environment.
4. This Safety Statement is aimed at protecting employees, students and visitors from potential injury or ill-health arising from our work activities.
5. This Safety Statement will be updated as necessary in light of new legislation, staff feedback, university structural changes and practical experience. In addition, the Safety Statement will be reviewed annually.
6. This Safety Statement is available to DCU Management and to all employees, visitors and students of the School of Mechanical and Manufacturing Engineering.

2. Statement of Safety, Health & Welfare at Work Policy

1. The policy of the School of Mechanical and Manufacturing Engineering is, in so far as is reasonably practicable, to ensure the safety, health and welfare at work of all our employees and further to ensure that persons not in our employment, who may be affected by the work activities are not thereby exposed to risks to their safety and health.
2. In particular the School of Mechanical and Manufacturing Engineering recognises its express responsibilities under Section 8 of the Act and will provide the necessary resources, structures and procedures required to safeguard staff, students and visitors against the risks arising from activities in our workplace.

3. The School of Mechanical and Manufacturing Engineering considers that it is the strict duty of all staff and students to conform to university safety policies and practices and to carry out their responsibilities as detailed in this document and in accordance with any other relevant legislation. Staff members with specific responsibilities for safety, health and welfare must properly delegate these in their absence.
4. In addition to reviewing this Safety Statement, each employee is expected to make himself/herself familiar with the DCU Framework Safety Statement. The Framework Safety Statement is available on the DCU Website.
5. Staff and students who fail to cooperate with safety procedures may be subject to the normal DCU disciplinary procedures.
6. The School of Mechanical and Manufacturing Engineering welcomes feedback from staff or students regarding any aspect of this document or any other health and safety concerns. Feedback in this regard should be directed to Dr. Lorna Fitzsimons (lorna.fitzsimons@dcu.ie).

Signed *Date*.....
(*Head of School of Mechanical and Manufacturing Engineering*)

3. Scope of Safety Statement

This safety statement deals in the main with the health and safety issues that fall within the remit of the School of Mechanical and Manufacturing Engineering. Our staff offices and operations are located in the following buildings:

Engineering and Research Building (S Building)
R&D Building (J Building)
N Building
Albert College (A building)

In addition, lectures take place at various estates within the DCU Campus
The scope of our operations includes

- *Classroom based teaching at undergraduate & postgraduate level.*
- *Lab based teaching at undergraduate & postgraduate level.*
- *Lab based research at postgraduate and post-doctorate level.*

4. Health and Safety Management Structure and Responsibilities

In accordance with the DCU Framework Safety Statement, the Head of School as part of his management function, is responsible for ensuring, so far as is reasonably practical, the health and safety of persons working, studying or visiting the School. In particular he is responsible for the following:

1. To ensure that we have prepared a Safety Statement relevant to our operations which complies with Section 20 of the Safety, Health and Welfare at Work Act.
2. To ensure that the safety statement is reviewed at least annually and that the Health and Safety Steering Group is notified that the review has been completed and is provided with any updated document which may result from such a review.
3. To ensure that all hazards are identified and risks controlled.
4. To ensure that regular safety inspections/audits are carried out to monitor compliance with the Safety Statement and legal requirements and to ensure appropriate follow-up action is taken.
5. To investigate all accidents to staff/students/visitors in their area of responsibility and to complete the DCU Injury/Incident Report forms as appropriate.
6. To ensure that the DCU Evacuation and First Aid Procedures are implemented and that sufficient Fire Wardens/First Aid personnel are available.
7. To ensure that staff are appropriately trained to carry out their duties safely and to ensure the attendance of staff at designated training courses as appropriate.

8. To ensure that students are adequately supervised in carrying out practical and experimental work. (Adequate level of supervision to be determined having regard to the age, level of experience and status (graduate/postgraduate etc.) of the student)
9. Based on risk assessment, to arrange for the provision of adequate and appropriate personal protective equipment for employees.
10. To notify the Estates Office of any health and/or safety issues arising within their area of operation requiring Estates Office action/input to resolve
11. To ensure that all contractors carrying out work in their area operate under the Estates Office Permit to Work system.

Dr. Lorna Fitzsimons is the School of Mechanical and Manufacturing Engineering Safety Advisor. She chairs the School Health and Safety Committee, which comprises Dr. Joseph Stokes (Head of School), Mr. Liam Domican, Mr. Michael May, Dr. Eoin Fox and Dr. Owen Clarkin.

Health and Safety updates and issues are reported at the School Executive meetings, which take place on a regular basis. In addition, staff are informed of Safety issues at School staff meetings. Appendix 1 details the Safety Management Structure in place within the School

5. Health and Safety Consultation on Campus

In order to ensure effective consultation with staff and other campus users, DCU Executive has established a Health and Safety Consultation group to provide a formal structure for the highlighting and resolution of more difficult Health and Safety problems/issues that cannot be resolved locally. The School of Mechanical and Manufacturing Engineering is represented on this Group by Dr. Lorna Fitzsimons.

Health and Safety issues that are not resolvable through internal channels can be referred through these representatives to the Health & Safety Consultation Group and ultimately the H&S Steering Group. In addition, the current Safety Representative for the university can be consulted informally and in confidence by individual staff members with a view to raising specific Health and Safety issues for resolution

6. Employee Co-Operation

Section 13 of the Safety, Health and Welfare at Work Act 2005 imposes a number of obligations on employees while at work:

- (1) An employee shall, while at work
 - a) *Comply with the relevant statutory provisions, as appropriate, and take reasonable care to protect his or her safety, health and welfare and the safety,*

- health and welfare of any other person who may be affected by the employee's acts or omissions at work,*
- b) Ensure that (s)he is not under the influence of an intoxicant to the extent that (s)he is in such a state as to endanger his or her own safety, health or welfare at work or that of any other person,*
 - c) If reasonably required by his or her employer, to submit to any appropriate, reasonable and proportionate tests for intoxicants by, or under the supervision of, a registered medical practitioner who is a competent person, as may be prescribed,*
 - d) co-operate with his or her employer or any other person so far as is necessary to enable his or her employer or the other person to comply with the relevant statutory provision, as appropriate,*
 - e) not engage in improper conduct or other behaviour that is likely to endanger his or her own safety, health and welfare at work or that of any other person,*
 - f) attend such training and, as appropriate, undergo such assessment as may reasonably be required by his or her employer or as may be prescribed relating to safety, health and welfare at work or relating to the work carried out by the employee,*
 - g) having regard to his or her training and the instructions given by his or her employer, make correct use of any article or substance provided for use by the employee at work or for the protection of his or her safety, health and welfare to work, including protective clothing or equipment,*
 - h) report to his or her employer or to any other appropriate person, as soon as practicable-*
 - i.) any work being carried on, or likely to be carried on, in a manner which may endanger the safety, health and welfare at work of the employee or that of any other person,*
 - ii.) any defect in the place of work, the system of work, any article or substance which might endanger the safety, health or welfare at work of the employee or that of any other person, or*
 - iii.) any contravention of the relevant statutory provisions which may endanger the safety, health and welfare at work of the employee or that of any other person,**of which (s)he is aware.*

(2) An employee shall not, on entering into a contract of employment, misrepresent himself or herself to an employer with regard to the level of training as may be prescribed under subsection (1)(f)

As well as these general duties, it is important that employees are aware of the health and safety duties assigned to them in this safety statement as part of their normal duties. These delegated duties are essential for the day to day implementation of safety measures, and employees are obliged to carry out these functions in accordance with Section 13(1)(d) of the Act, as above.

Section 14 of the Act applies to all persons and requires that:

A person shall not intentionally, recklessly or without reasonable cause—

- (a) *interfere with, misuse or damage anything provided under the relevant statutory provisions or otherwise for securing the safety, health and welfare of persons at work, or*
- (b) *place at risk the safety, health or welfare of persons in connection with work activities.*

In addition to the above legal requirements all staff and students of the School of Mechanical and Manufacturing Engineering are required to immediately report to Dr. Joseph Stokes, Head of School, any accident resulting in loss or injury and any incident that could have resulted in loss or injury. The injured party is also required to co-operate in the investigation of the incident and the completion of the Injury/Incident Report Form.

7. Health & Safety Resources

Considerable resources are expended by the School of Mechanical and Manufacturing Engineering in securing the health, safety and welfare of employees in terms of personnel, time, materials, equipment and the purchase of goods and services.

Where additional equipment, training etc. is required (whether as a result of ongoing risk assessment or legislative change), resources will be allocated on a prioritised basis to meet the identified requirements.

The Health and Safety Office retains a reference library of texts, literature, videos and other publications on health and safety matters. The Office also subscribes to an online database of safety legislation, codes of practice and international standards. All staff can gain access to these information resources by contacting the Health & Safety Office.

8. Health and Safety Training

The provision of appropriate training and instruction is an important element in the management of safety and the implementation of this safety statement. Such training is also a legal requirement in controlling many of the risks identified in the School. Training and instruction also serve to improve safety awareness and attitudes that are essential for effective safety management.

In addition to our statutory duty to employees, the School also has a common law duty to all undergraduate and postgraduate students to provide such training as is necessary to enable the students to undertake their studies in a manner which, in so far as it is reasonably practicable, is safe and does not give rise to risks to health or

expose the individual student or other persons to unacceptable levels of risk. The provision and extent of any necessary training is dependent upon the nature of the academic discipline being pursued, the experience and disposition of the students involved, their familiarity with any equipment/substances to be utilised, the environment/conditions where the activities may be discharged, and the extent to which supervision is necessary and available.

Research students are asked to familiarise themselves with the School of Mechanical and Manufacturing Engineering Safety Statement and Safety Handbook.

9. Health and Safety Office Training

The Health and Safety Office is responsible for providing the following specific Health and Safety Training on an ongoing basis:

- (1) Health and Safety Induction of all new employees and students including information on fire and emergency procedures.
- (2) Manual Handling Training
- (3) Fire Warden Training
- (4) First Aid Training
- (5) Management Training in Health and Safety
- (6) Out of Hours Policy Induction Training
- (7) Emergency Response Plan Training
- (8) Risk Assessment & Control Training
- (9) Office Ergonomics Training
- (10) Other central training where risk assessment identifies specific campus need.

Details of upcoming courses are advertised via e-mail on an ongoing basis. As staff will generally be involved in manual handling at some stage in DCU, all staff of the School of Mechanical and Manufacturing Engineering are required to attend Manual Handling training provided by the Health & Safety Office.

10. Fire and Emergency Management

In the case of an emergency contact Extn. 5999.

Fire Wardens

The following members of staff are trained Fire Wardens:

Name	Extn.	Location
Liam Domican	8365	N110d
Chris Crouch	5824	SB14

Paul Young	8216	S374
Lorna Fitzsimons	7716	S388

Their role is to sweep their designated section of the building in the event of alarm activation and to provide information on building occupancy etc. to DCU security and the emergency services in the event of a genuine emergency. All staff and students are required to comply with the instructions of Fire Wardens and to evacuate the building promptly in the event of an emergency.

The School of Mechanical and Manufacturing Engineering will ensure that sufficient Fire Wardens are trained and available on an ongoing basis to provide an effective service throughout the building. The School Safety Advisor, Dr. Lorna Fitzsimons, is responsible for ensuring that the Health & Safety Office is notified of any changes in the Fire Warden Team and for ensuring that names of new Fire Wardens are added to the waiting list for training.

Evacuation Drills

Evacuation Drills are organised twice annually by the Health and Safety Office in cooperation with the Estates Office. Feedback on performance in terms of time taken to evacuate and particular difficulties with alarm systems / building fabric are notified to all staff via e-mail.

The DCU Evacuation procedure is posted on the Health & Safety Website.

Local measures

All staff are required to familiarise themselves with the locations of

- (a) Escape routes
- (b) Fire alarm call points (red break glass units)
- (c) Fire extinguishers and fire blankets
- (d) Fire assembly points

First Aid and Injury/Illness Management

Fully stocked First Aid boxes are available in all laboratories. A Defibrillator is located in the Reception area of the Engineering and Research building.

The following members of staff are trained as Occupational First Aiders.

Name	Extn.	Location
Michael May	8885	SB13
Liam Domican	8365	N110d

They are available to respond to First Aid incidents during normal office hours. In addition all permanent members of the DCU Security team undergo Occupational First Aid Training

with a view to providing first aid response up until 10pm Monday – Friday and to 6pm on Saturday & Sunday.

The School Safety Advisor, Dr. Lorna Fitzsimons, is responsible for ensuring that the Health & Safety Office is notified of any changes in the First Aid Team and for ensuring that names of new First Aiders are added to the waiting list for training.

The DCU First Aid Policy & Procedures, Injury / Incident Management Procedure and the Emergency Ambulance Assistance Procedure are posted on the Health & Safety Website.

Hazard Identification, Risk Assessment & Controlling Risks

A comprehensive review and assessment of hazards, risks and controls within the School has been undertaken. This exercise has been carried out in accordance with the definitions and procedures noted below. Appendix 2 contains details of the current Risk Assessments & Control Measures in place in the School of Mechanical and Manufacturing Engineering. All new and amended equipment, procedures and processes will be similarly assessed as they arise and the results similarly recorded. All staff are encouraged to review the hazards listed in Appendix 2 to identify any issues that are not currently assessed and to feedback to the School Safety Committee, through Dr. Lorna Fitzsimons.

In relation to postgraduate research, the Academic Supervisor is responsible for carrying out ongoing risk assessment of the research in consultation with the postgraduate student. He/She must ensure that control measures in place comply with all health and safety regulations currently in force. A copy of all such written risk assessments must be supplied to the School Safety Committee for review and recording purposes.

Definitions

Hazard is any substance, article, material or practice within a workplace which has the potential to cause harm to employees at work or visitors to that workplace.

Hazards are categorised as Physical, Chemical, Biological, Organisational, Environmental or Human.

Risk is the potential of the hazard to cause harm in the actual circumstances of use.

Risk Assessment is the evaluation of the likelihood that harm could arise from the hazard and the likely severity and extent of the harm.

The outcome of qualitative risk assessment requires that the identified hazards be given a risk rating of ‘high’, ‘medium’, or ‘low’. Control measures are prioritized based on the risk rating and are commensurate with the level of risk.

Risk Control

In selecting controls the following hierarchy is adopted.

1. Elimination
2. Substitution
3. Enclosure
4. Guarding
5. Safe systems of work
6. Supervision
7. Training/Information
8. Personal protective equipment (PPE)

All final decisions on risk control must take into account the relevant legal requirements and industry codes of practice.

Risk assessments are particularly important in the science, engineering and manual work areas. Activities including the use of hazardous chemicals or machinery, field trips, science based practicals/demonstrations/research projects, hazardous physical manipulations, maintenance of hazardous machinery, and the manufacture of new hazardous substances or equipment etc., require rigorous risk assessments with carefully documented and implemented controls. Where possible, controls and other safety measures identified in the risk assessment process must be put in place immediately. In other cases where the scale or cost prohibits immediate action, a programme of action must be planned by the relevant head of department/section and put into effect and the relevant deadline listed in the Safety Statement. Depending on the risks involved, appropriate interim action must be taken, i.e. if high, discontinuing the operation in the interim must be considered. The implementation of these arrangements must be reviewed at regular intervals.

Unacceptable Risk

Where the risk cannot be reduced to acceptable levels and funding is not available to implement appropriate controls, it is the policy of School to require that the activity cease or the area close.

11. Management of Contractors

DCU Estates Office operates a mandatory Permit to Work system for all contractors, incorporating a Hot Work Permit System where necessary. All work undertaken by outside contractors on behalf of the School of Mechanical and Manufacturing Engineering must be carried out under an Estates Office issued Permit to Work.

Details of the Permit to Work system are available on the Estates Office web site.

12. Bullying and Harassment

The DCU Policy to Promote Respect and Protect Dignity outlines the procedures which should be followed by any member of the University Community who may experience sexual harassment, harassment or bullying.

13. Stress at Work

The School of Mechanical and Manufacturing Engineering recognises that from time to time staff may experience work related stress. It is our aim to be proactive in the reduction / management of sources of stress. Staff who are subject to occupational stressors are encouraged to seek assistance from the School management or from DCU Human Resources Department.

14. Pregnant Employees

The School of Mechanical and Manufacturing Engineering is committed to protecting the reproductive health of all employees and students and minimising risks to the unborn. In accordance with the Safety, Health & Welfare (Pregnant Employees) Regulations (Regulation 3), a pregnant employee of the School must notify her immediate supervisor of her condition *'as soon as is practicable after it occurs and, at the time of the notification, give to her employer or produce for her employer's inspection a medical or other appropriate certificate confirming her condition'*. Pregnant employees must complete the Pregnancy Employees Risk Assessment Form http://www.dcu.ie/safety/pregnancy_lab.shtml or http://www.dcu.ie/safety/pregnancy_office.shtml for submission to the Head and the Health and Safety Office. Where the preliminary assessment highlights areas of concern, the Health and Safety Office will complete a more in-depth assessment in conjunction with the employee and the Safety Officer, Dr. Lorna Fitzsimons of the School of Mechanical and Manufacturing Engineering, to establish appropriate controls.

Pregnant students are also encouraged to inform DCU Registry of their condition such that appropriate risk assessment may be carried out.

15. Out of Hours Work

Out of hours working is defined as follows:

Any Laboratory / Experimental work undertaken outside of 9am-5.15 pm,
Monday – Friday

Any other work undertaken outside of 7am-10pm Monday – Friday and
during the hours of 9am-6pm on Saturday, Sunday & Bank Holidays.

The School of Mechanical and Manufacturing Engineering strongly recommends that in the interest of health, safety and personal security, out of hours work should only be undertaken when absolutely necessary and no other alternatives are available. Where employees or postgraduate students need to undertake work out of hours they must adhere strictly to the University Policy & Procedures for Lone/Out of Hours Work. This policy is available on the Health & Safety Office Website http://www4.dcu.ie/safety/out_of_hours.shtml.

Appendix 1: Organisation for Safety

**Head of School
(Dr. Joseph Stokes)**

**Safety Advisor
(Dr. Lorna Fitzsimons)**

Health and Safety Committee

HoS (Dr. Joseph Stokes), Safety Advisor (Dr. Lorna Fitzsimons), Chief Technical Officer (Mr Liam Domican), Senior Technical Officer (Mr Michael May), Postdoctoral researchers (Dr. Eoin Fox and Dr. Owen Clarkin)

Appendix 2: Risk Assessments & Controls

Appendix 2 details the Risk Assessments carried out in each Laboratory under the control of the School of Mechanical and Manufacturing Engineering.

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
13-May-13	Dermot Brabazon	AG48	Carbolite 1600 Furnace	burning from heating elements or heated contents	M	Enclosed in unit.
13-May-13	Dermot Brabazon	AG48	Stir Casting Rig	burning from heating elements or heated contents. Entrapment in moving parts.	M	Heaters are enclosed and thermostatically controlled
13-May-13	Dermot Brabazon	AG48	Top Loading Furnace	burning from heating elements or heated contents	M	Unit is protected by Residual circuit breaker

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
7-Nov-06	Dermot Brabazon	AG48	Semi Solid Extrusion / Viscometer Rig	burning from heating elements or heated contents. Entrapment by moving parts,	M	Cage covering plunger with cut off safety switch installed. Separate cut off safety switch installed. Area where metal is pushed through is enclosed.
13-May-13	Chris Crouch Joe Stokes	AG48	Furnace Lenton 1200'C	Heat from furnace assembly -burns injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	AG48	Furnace Lenton 1200'C	Heat from furnace assembly -burns injury	L	instruction of operator in use of equipment
09/05/2013	LD/LF/RP	AG48	Furnaces (general)	Carbolite furnace door difficult to close; Burns; Fume build-up; Trip/slip hazards;	M	Heating elements enclosed in furnaces; Operation by trained staff/researchers; Correct PPE must be worn at all times; Material handling equipment to be used at all times. Standard operating procedures to be developed by the relevant researchers.
09/05/2013	HE/LF/LD/RP	AG48	Automated Weighing Machine	Electrocution; Electrical burns; Trip hazard due to cabling; Falling/dropping weights; Mechanical failure of the crane hoisting weights; Lifting of weights due to poor manual handling could cause injury.	L/L/M/L/L/M	This research equipment is currently under development. Operation by trained staff/research students only; Correct manual handling techniques to be used; Cabling to be moved to away from main walk ways; Electrical connections to be secured and ensured to be operating correctly prior to use; Power to be switched off when working on electrical components. Standard operating procedures to be developed when development work is complete.

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
09/05/2013	AO/LF/LD/RP	AG48	Bliss mechanical press	Risk of crushing due to contact with rotating parts; Key switch is detached from equipment and may be prone to tampering; High pressure operation may lead to collisions/impacts;/explosions. Clutter in the vicinity a trip hazard.	L/L/L/M	Only trained staff/researchers to operate the mechanical press. Bliss press will not operate until guard gate is down. Operating procedures and log book required for use. Appropriate PPE (e.g. eye protection) to be worn. Standard operating procedures to be developed by the relevant researcher.
09/05/2013	AO/LF/LD/RP	AG20	Bulge form mechanical press	Crush risk; High pressure operation may lead to collisions/impacts/explosions. Clutter in the vicinity of the equipment could result in falls/trips.	M/M/M	Only trained staff/researchers to operate the mechanical presses. Operating procedures and log book required for use. Wear appropriate PPE (e.g. eye protection). Standard operating procedures to be developed by researcher.
09/05/2013	AO/LF/LD/RP	AG20	Enerpack mechanical press)	Crush risk; High pressure operation may lead to collisions/impacts/explosions. Clutter in the vicinity of the equipment could result in falls/trips.	M/M/M	Only trained staff/researchers to operate the mechanical presses. Operating procedures and log book required for use. Wear appropriate PPE (e.g. eye protection). Standard operating procedures to be developed by researcher.

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
09/05/2013	DB/LF/LD/RP	AG48	Ballistic machine	Entrapment of hands in barrel at loading position; Injury or harm caused by projectile firing; Excessive noise level; Trip hazards surrounding equipment; Failure of the compressed air cylinder/system;	M/L/M/M/L	Only trained staff/researchers to operate the equipment. A safe distance must be maintained when operating the equipment; Ensure connections are properly secured and assess functionality of the ballistic machine periodically. Appropriate PPE to be worn including noise protection when operating the equipment. Adopt correct manual handling techniques when lifting projectiles into and out of the machine. Standard operating procedures to be developed by the relevant researchers.
09/05/2013	LF/LD/RP	AG48	General equipment	Electrocution during development and upgrade of equipment in the laboratory; Lack of appropriate signage/labelling of devices and experimental tests poses a hazard; Poor housekeeping in the lab including a lack of cleaning materials/equipment (Spillages in the lab not cleaned); Trip hazards on air-lines, equipment and electrical cables; Correct manual handling techniques to be followed at all times.	L/M/M/M/M	All electrical circuits fused and components earthed; Only trained staff/researchers to work in the lab; OOH policy and buddy system in place; Equipment and cabling removed from walk ways;
13-Feb-06	Harry Esmonde	LG28	ER test rig	Only those trained by HE use rig	L	High voltage source when not in use is switched off and power supply also switched off(at two places). Medium torque motor required password to operate. Only those trained by HE use rig. Rig should not be left operating unattended.
13-Feb-06	Harry Esmonde	LG28	ER Test Rig - High Voltage supply	electrocution	M	Operators are trained and the system is properly grounded. When not in use the power to the voltage supply unit is set to zero and switched off. The output is current limited to 16 mAmps.
13-Feb-06	Harry Esmonde	LG28	ER Test Rig - Medium torque motor	Entrapment	L	The motor can only be operated by way of password.

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
19/02/2013	Silvia Tedesco / Dr Abdul Olabi	N110b	Elemental analyser furnace (800°C)	Burning from heating elements.	L	The combustion chamber is completely isolated from the other parts of the machine and thus the operator is not exposed to any burn hazard. Use of gloves is recommended during load/unload operations.
20/02/2013	Silvia Tedesco / Dr Abdul Olabi	N110b	Oxygen: Flammable gases/ Explosive hazards	Oxygen supports combustion making normally stable materials flammable.	H	Wear gloves compatible with oxygen. Ensure that all gauges are free from damage and that the protective casings or glasses are not cracked. Check that ventilation is adequate. Fire Alarm. Fire extinguisher.
21/02/2013	Silvia Tedesco / Dr Abdul Olabi	N110b	Asphyxiant gases: Helium	Asphyxiation risk: Can cause rapid suffocation. May cause sever frostbite. Acute or chronic respiratory conditions may be aggravated by exposure to this gas.	L	Adequate air volume change by the air conditioning system. Adequate air volume change by the ventilation system.
7-Nov-06	Dermot Brabazon	N110b	DTA/TGA	burning from heating elements or heated contents	L	Controller only goes to set temperature. Chamber is enclosed and is small. External surface of device remains around room temperature.
7-Nov-06	Dermot Brabazon	N110b	Dilatometer	burning from heating elements or heated contents	L	Controller only goes to set temperature. Chamber is enclosed and is small. External surface of device remains around room temperature.

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
17-Nov-06	Michael May / Aran Rafferty	N110b	Porosimeter	Mercury poison	M	Cold trap on unit to prevent mercury vapour escaping to atmosphere. Selector valve should be turned to pressure mode and the pressure valve kept closed when not in use.
17-Nov-06	Michael May / Aran Rafferty	N110b	Porosimeter	Mercury poison	M	Plastic gloves and fume hood to prevent contact with mercury or possible mercury vapour during handling of parts
17-Nov-06	Michael May / Aran Rafferty	N110b	Porosimeter	Mercury poison	M	Mercury collector provided to pickup spilt drops of mercury
17-Nov-06	Michael May / Aran Rafferty	N110b	Porosimeter	Mercury poison	M	Waste drum provided to store waste mercury and mercury contaminated items. The drum is to be collected by waste management company
17-Nov-06	Michael May / Aran Rafferty	N110b	Porosimeter	Mercury handling	H	
17-Nov-06	Michael May / Aran Rafferty	N110b	Porosimeter	Mercury handling	H	Equipment to be used by trained staff only

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
17-Nov-06	Michael May / Aran Rafferty	N110b	Porosimeter	Risk from high pressure system on the Autoscan unit	M	Safety system is comprised of pressure relay, backup relay, rupture disc and motor trip switch. Only trained personnel should use the machine. The unit should not be used without the rupture disc in place
17-Nov-06	Michael May / Aran Rafferty	N110b	Porosimeter	Burns from liquid nitrogen	M	Face shield and gloves provided. And Liquid Nitrogen stored in cryogenic container
28-Aug-09	Damian Christie	NG12	Nachi SC35-F Robot Arm with AX Controller	Injury - Robot Arm moves too rapidly for operator to avoid	M	Operator familiar with safety procedures in Nachi AX Controller Operating Manual Installation Manual Chapter 1.1 and Nachi Maintenance Service Manual SC/SR Series [AX] Manual Chapter 2.1. Operator uses teach pendant with dead-man switch when working in proximity to active Robot Arm. Automatic operation of Robot Arm takes place only when enclosure is vacant and enclosure door is closed
28-Aug-09	Damian Christie	NG12	Nachi SC35-F Robot Arm with AX Controller	Injury - Unexpected movement by robot arm, operator unaware that robot arm is active	M	Warning Lamp installed to indicate when AX Controller is powered on (Orange) and when Robot Arm control is active (Red). AX Controller Stop buttons pressed when working in enclosure
28-Aug-09	Damian Christie	NG12	Nachi SC35-F Robot Arm with AX Controller	Injury - Unauthorised person enters Robot Arm enclosure	M	Robot work area completely enclosed by barriers and lockable door. Warning signs on barriers and door. Full visibility through barriers into enclosure for operator
28-Aug-09	Damian Christie	NG12	Nachi SC35-F Robot Arm with AX Controller	Injury - Unauthorised person attempts to operate Robot Arm	L	AX Controller power switch locked out when not in use

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28-Aug-09	Damian Christie	NG12	Electrical cables	Electrocution	L	Armoured cable used for AX Controller supply. Cable routed away from enclosure working area
28-Aug-09	Damian Christie	NG12	Compressed Air	Injury	L	Operators familiar with use of compressed air and fittings.
28-Aug-09	Damian Christie	NG12	Soldering Iron	Burn	L	Operators familiar with use soldering iron
28-Aug-09	Damian Christie	NG12	Hand Tools	Injury	L	Operators familiar with use of hand tools
13-May-13	Chris Crouch Joe Stokes	NG12	Melt Flow Indexer	Heat from furnace assembly -burns injury Thermometer contains mercury - severe injury Incorrect use of Weights or samples - severe injury	L	instruction of operator in use of equipment
7-Nov-06	Dermot Brabazon	S111	Large Laser Scanner for Surface Defects	Damage to eye by directly looking at emitting laser. Entrapment by moving stages.	L	Unit is protected by Residual Circuit Breaker.
7-Nov-06	Dermot Brabazon	S111	Small Optical Surface Defect Detection System	Damage to eye by directly looking at emitting laser. Entrapment by moving stages.	L	Unit is protected by Residual Circuit Breaker.

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7-Nov-06	Dermot Brabazon	S111	Laser Surface Treatment - Nd:YVO4	Damage to soft tissue by exposure to IR laser radiation. Entrapment by moving stages.	M	enclosed in unit. Only those trained and signed off on equipment can use it.
Sep-09	Shadi Karazi	S111	Laser System	Identification: laser system running (orange button is lit) Avoid eye or skin exposure to direct or scattered radiation	H	Laser Protective Goggles
Sep-09	Shadi Karazi	S111	3D positioning system	crushing fingers in rotating parts	L	
08-Jan-13	Dermot Brabazon /Aymen Ben Azouz	S111	Nd:YAG laser	The laser: a. Skin burn; b. Eye burn; Beam delivery: Optics failure ; Laser process: Heavy loads, moving parts	M,M,L, M,L	The laser system has been fitted with a fully protective enclosure thereby making it a class 1 laser system. An integrated safety interlock system was put in place which disables the laser once breached. Emergency stop switches have also been incorporated into the system. Suitable Personal Protective Equipment – Nd:YAG goggles are available to all users and must be worn by everyone using the system. Optics adjustment tools are provided to avoid the user from using their bare hands. Supplied gloves are to be used during removal of damaged optics or regular cleaning of optics. An integrated safety interlock system was put in place which disables the motion system once breached. The motion system comes equipped with limit switches which can be programed to limit the motion in specified zones.

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23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	S112	Noise generated by the thermal spraying process	Stress, difficulty in communication, long term hearing loss, tinnitus	M for flame spray - H for plasma spray	The use of ear plug AND ear muffs by the user. Soundproof laboratory.
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	S112	Radiant energy emitted by the flames.	Cataract, burns, arc-eye	L for flame spray - M for plasma spray	Placement of an anti-UV light protective curtain. The use of an adequate protective welding mask by the operator.
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	S112	Fume and dust generated by the thermal spraying process.	Fire and explosion, toxic effects by inhalation, toxic effects by skin contact	L-H for all processes (Depends on Process/ Powders)	Placement of an extraction booth just in front of the spraying gun allowing removal of all airborne particulates and residual gases from gun that are not deposited onto the sample. The use of an adequate gas and particle filters mask by the operator. Personal protection includes: Gloves, Lab Coat, Goggles -prevent skin contact. Hoover available and Cleaning Procedure
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	S112	Mechanical hazards	Trips and falls, Traverse Unit Movement	L for all processes	Safety features installed on the booth to accommodate cooling and power supply pipes that were hanging off the ground. Clear walk way space. Traverse Unit safety Mechanism
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	S112	Electrical Hazard	Electric shock, explosion, fire, burns	L for all processes	The presence of an emergency cut-off switch at reach distance from the operator. Burn Spray for skin burns
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	S112	Compressed gases	Unintended pressure release, manual handling, toxicity, fire and explosion	L for all processes	Placement of gas valves at an isolated area of the lab to avoid accidents. Temporary gas bottles will be placed in an trolley so avoid manual handling. Other gases stored outside building

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23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	S112	Asphyxiant gases	Asphyxiation risk (inert gases such as nitrogen and argon)	L for all processes	Adequate air volume change by the air conditioning system. Oxygen sensor alarm above the spraying equipment. Extraction use, Gas Mask
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	S112	Flammable gases	Fire and explosion risk (oxygen, acetylene, hydrogen)	L for flame spray - H for plasma spray (hydrogen)	Fire Alarm. Fire extinguisher
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	S112	Other general Items Raise by Sulzer Metco H&S representative following Maintenance/Calibration in August 2010	See Additional List Overleaf	L	Implement through Final Year Project 2010/2011
10-May-13	Michael May	S124a	Scanning electron microscope	Danger from pressurised gas	L	Pressurised gas regulated. Unit regularly serviced. Operation of equipment to be carried out by trained personnell only
10-May-13	Michael May	S125	Motopol Semi automatic Specimen preparation unit	Risk from moving Parts	M	Two hand starting switch incorporated in machine. Operation of equipment to be carried out by trained personnell only
10-May-13	Michael May	S125	Simplet 2000 Mounting press	Danger from pressurised gas	L	Pressurised gas regulated. Operation of equipment to be carried out by trained personnell only
10-May-13	Michael May	S125	Abrasimet 2 circular saw	Risk from moving Parts	M	Rotating parts enclosed and protected by electrical interlock. Operation of equipment to be carried out by trained personnell only
10-May-13	Michael May	S125	Scancoat six sputter coater	Danger from high vacuum	M	Vacuum interlock switch and chamber microswitch in place. Operation of equipment to be carried out by trained personnell only

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9-May-13	Alan Meehan	SB12	Instrumentation and Control plug points	Electric Shock - severe injury/death	L	220V AC socket outlets are protected by residual current devices (RCD's) with 30mA/30mSec sensitivity.
9-May-13	Alan Meehan	SB12	Load Cell Experiment/ Load Cell	No hazard identified	L	Not Required
9-May-13	Alan Meehan	SB12	All equipment	No maintenance data sheet	L	All equipment checked annually for correct operation, instructions on correct use given at the start of each practical session to students
9-May-13	Alan Meehan	SB12	Load Cell Experiment/ Power Supply	Electric Shock - minor injury	L	Not required- voltage output not sufficient
9-May-13	Alan Meehan	SB12	Load Cell Experiment/ Compression device	Damage to fingers	L	Supervision/ Instruction in use given to students
9-May-13	Alan Meehan	SB12	Load Cell Experiment/ RDP E725 load cell indicator	No hazard identified	L	Not Required
9-May-13	Alan Meehan	SB12	Load Cell Experiment/ Locktronic Baseboard and components	No hazard identified	L	Not Required
9-May-13	Alan Meehan	SB12	Load Cell Experiment/ Digital Multimeter	No hazard identified	L	Not Required

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9-May-13	Alan Meehan	SB12	Instrumentation and Control- Personal Computers	Repetitive Strain Injury	L	Lab is max 3 hours long. Experiments are not computer intensive
9-May-13	Alan Meehan	SB12	Thermocouple Experiment/ LabView Breakout box	If opened minor risk of trapping fingers	L	Not necessary to open during the experiment
9-May-13	Alan Meehan	SB12	Thermocouple Experiment/ Thermocouples	No hazard identified	L	Not Required
9-May-13	Alan Meehan	SB12	Thermocouple Experiment/ Use of glass beakers	Risk of cuts if broken	L	No special requirements
9-May-13	Alan Meehan	SB12	Thermocouple Experiment/ Use of boiling water	Potential Burning	L	Boiling water distributed by Technician/ Lab Supervisor. Kettle kept in separate area of room. Students warned of potential injury risks
9-May-13	Alan Meehan	SB12	Thermocouple Experiment/ Use of ice	Potential slippage if it falls on floor	L	Fridge in outside area. Ice distributed in container by Technician/ Lab Supervisor. Students warned of risk
9-May-13	Alan Meehan	SB12	Accelerometer experiment/ LVDT	No hazard identified	L	Not Required
9-May-13	Alan Meehan	SB12	Accelerometer experiment/ Accelerometer	No hazard identified	L	Not Required
9-May-13	Alan Meehan	SB12	Accelerometer experiment/ Charge Amplifier	No hazard identified	L	Not Required

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9-May-13	Alan Meehan	SB12	Accelerometer experiment/ Transducer amplifier	No hazard identified	L	Not Required
9-May-13	Alan Meehan	SB12	Accelerometer experiment/ Power Supply	Electric Shock - minor injury	L	Not required- voltage output not sufficient
9-May-13	Alan Meehan	SB12	Accelerometer experiment/Beam Support	No hazard identified	L	Not Required
9-May-13	Alan Meehan	SB12	Accelerometer experiment/Beam	Hangs out over edge of desk-potential snagging	L	Direct access to edge of desk blocked by seating, students can clearly see the beam
9-May-13	Alan Meehan	SB12	Motor Control Experiment/ Power Supply	Electric Shock - minor injury	L	Not required- voltage output not sufficient
9-May-13	Alan Meehan	SB12	Motor Control Experiment/ Motor Control Board	Electric Shock - minor injury	L	Guard on electronic devices
9-May-13	Alan Meehan	SB12	Motor Control Experiment/ Motor Control Board	Motor shaft protrudes- minor injury	L	Shaft is very small, is positioned away from students
9-May-13	Alan Meehan	SB12	MatLab Experiment/ PC based	As Above Personal Computer Use Risks	L	

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9-May-13	Alan Meehan	SB12	Flow Control Experiment/ 38-600Temperature process rig	Water borne infection	L	Unit is closed system, student does not interfere with the apparatus during experiment. Technician maintains equipment and is aware of hazard
9-May-13	Alan Meehan	SB12	Flow Control Experiment/ 38-100 Basic Process rig	Water borne infection	L	Water is emptied when semester ends and refilled when required
9-May-13	Alan Meehan	SB12	Flow Control Experiment/ 38-100 Basic Process rig	Water pump immersed in water/ shock hazard	L	Pump is designed and sealed to operate in water. Device is checked at start of semester and operation verified
9-May-13	Alan Meehan	SB12	Feedback 38-200 Process Interface	Positioned on top of shelf on desk - falling hazard	L	No risk under normal operating conditions - shelf can easily support weight and is of sufficient width
9-May-13	Alan Meehan	SB12	Feedback 38-300 Process Controller	Positioned on top of shelf on desk - falling hazard	L	No risk under normal operating conditions - shelf can easily support weight and is of sufficient width
9-May-13	Alan Meehan	SB12	MCB cabinet present in room	No hazard identified	L	Cabinet is locked - no access for unauthorised personnel
9-May-13	Alan Meehan	SB12	Sink present in room	Slippage/ Burn from hot water	L	Students do not use the sink, they are supervised during labs

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Jul-12	LD/Iffat Zehra Naqvi	SB13	Isomet 1000 Precision Saw	Splinters of material could damage eye. Damage to hand or other body part if lands on operating blade by accident. Biological material could contaminate the device and cause illness to user. Blade and sample can cause burns to user after cutting due to friction heat.		Engineering: Fully enclosed cutting compartment - Machine stops functioning if shield is removed - Removable coolant tray. Weight arm and micrometer controls located outside - Coolant liquid with antirust protect changed periodically to keep sample and blade cool during operation. - Administrative: User Manual - Process risk assessed if biological material is cut - Biological material has not been cut for past few years.
Jul-12	LD/Iffat Zehra Naqvi	SB13	Bibby HB502 Magnetic Hot Plate/ Stirrer	Burn hands if left on, electric shock		Caution sign on the side of stirrer
Jul-12	LD/Iffat Zehra Naqvi	SB13	Chemflow CSC Fume Cupboard	Toxic cell stain materials		Inside fume cupboard, Hazard Signs
Jul-12	LD/Iffat Zehra Naqvi	SB13	Biotech Galaxy CO2 Incubator - Borrowed from BDI as heater (to maintain 37 degrees).	Electric Shock		Engineering - Grounded cables according to standards. Administrative - Labels on device
Jul-12	LD/Iffat Zehra Naqvi	SB13	Medite Tissue Floatation Bath TFB 45	Dry glass bowl in bath can get very hot if heater on, can cause burns.		
7-Nov-06	Dermot Brabazon	SB13a	Macroscope (Optical)	Electric shock leading to injury	L	Unit is protected by Residual Circuit Breaker.

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7-Nov-06	Dermot Brabazon	SB13a	Spark Analyser	Electric Shock - severe injury/death	L	Unit is protected by Residual Circuit Breaker. Needs sign of on training before student can use this.
13-May-13	Chris Crouch Joe Stokes	SB13	Zwick Z5 kN Material Testing Machine	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB13	Zwick Z5 kN Material Testing Machine	Moving Parts - severe injury	L	Safety shield and interlock sw must be set
13-May-13	Chris Crouch Joe Stokes	SB13	Zwick Z5 kN Material Testing Machine PC	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB13	Zwick Z5 kN Material Testing Machine Monitor	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Torsion Apparatus [mfg co HI- Tech]	specimen fracture - severe injury Incorrect use of Weights or samples - severe injury	L	Safety glasses are worn when using this apparatus Instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Torsion Apparatus [mfg co P.A.HILTON]	specimen fracture - severe injury Incorrect use of gearbox assembly	L	Safety glasses are worn when using this apparatus Instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Hounsfield Material Testing	Moving Parts - severe injury Incorrect use of samples - severe injury	L	Safety cover encloses machine instruction of operator in use of equipment

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13-May-13	Chris Crouch Joe Stokes	SB14	OMAG Hardness tester	Moving Indenter and base - severe injury Incorrect use of samples - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Density Determination Kit	Thermometer contains mercury - severe injury Incorrect use of Weights or samples - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Hotplate	Heat from plate assembly - burns injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Leitz Microhardness tester	Moving Indenter and base - severe injury Incorrect use of Weights or samples - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Hounsfield Material Testing Machine	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Hounsfield Material Testing Machine	Moving Parts - severe injury	L	Safety cover to enclosed in unit
13-May-13	Chris Crouch Joe Stokes	SB14	Hounsfield Material Testing Machine PC	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Hounsfield Material Testing Machine Monitor	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Pendulum Impact Tester	Moving Parts - severe injury	L	Safety cover to enclose unit
13-May-13	Chris Crouch Joe Stokes	SB14	Pendulum Impact Tester	Compressed Air - severe injury	L	standard fittings fixed to wall in enclosed in safety cover

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13-May-13	Chris Crouch Joe Stokes	SB14	Pendulum Impact Tester	specimen fracture - severe injury	L	Safety glasses are worn when using this apparatus
13-May-13	Chris Crouch Joe Stokes	SB14	OMAG Hardness tester	Moving Indenter and base - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Thin Cylinder Apparatus # 1	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Cylinder pressurised with oil	Pressurised with oil - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Thin Cylinder PC and software	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Thin Cylinder Apparatus # 2	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Cylinder pressurised with oil	Pressurised with oil - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Thin Cylinder PC and software	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	NG12	Diaphragm Apparatus # 1	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	NG12	Diaphragm pressurised with oil	Pressurised with oil - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	NG12	Diaphragm Apparatus # 2	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	NG12	Diaphragm pressurised with oil	Pressurised with oil - severe injury	L	instruction of operator in use of equipment

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13-May-13	Chris Crouch Joe Stokes	SB14	Torsion Apparatus HI- Tech	specimen fracture - severe injury	L	Safety glasses are worn when using this apparatus
13-May-13	Chris Crouch Joe Stokes	SB14	Torsion Apparatus HI- Tech	Incorrect use of Weights - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Torsion apparatus PA HILTON	specimen fracture - severe injury	L	Safety glasses are worn when using this apparatus
13-May-13	Chris Crouch Joe Stokes	SB14	Torsion PA HILTON transducers	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Creep Apparatus # 1	specimen fracture - severe injury	L	Safety shield provided when using this apparatus
13-May-13	Chris Crouch Joe Stokes	SB14	Creep Apparatus # 1	Incorrect use of Weights - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Creep Apparatus # 2	specimen fracture - severe injury	L	Safety shield provided when using this apparatus
13-May-13	Chris Crouch Joe Stokes	SB14	Creep Apparatus # 2	Incorrect use of Weights - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Beam Apparatus 1	Incorrect use of Weights - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Beam Apparatus 2	Incorrect use of Weights - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Strut Apparatus # 1	specimen fracture - severe injury	L	Safety glasses are worn when using this apparatus
13-May-13	Chris Crouch Joe Stokes	SB14	Strut apparatus pressurised with oil	Pressurised with oil - severe injury	L	instruction of operator in use of equipment

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13-May-13	Chris Crouch Joe Stokes	SB14	Strut Apparatus # 2	specimen fracture - severe injury	L	Safety glasses are worn when using this apparatus
13-May-13	Chris Crouch Joe Stokes	SB14	Strut apparatus pressurised with oil	Pressurised with oil - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Photoelastic Apparatus	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Photoelastic Apparatus	Incorrect handling of Lenses - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	NG12	Melt Flow Indexer	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	NG13	Melt Flow Indexer	Heat from furnace assembly -burns injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	NG14	Melt Flow Indexer	Thermometer contains mercury - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Avery Balance	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Density Determination Kit	Thermometer contains mercury - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Kern Balance	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Hotplate # 1	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Hotplate # 1	Heat from furnace assembly - burhs injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Hotplate # 2	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed

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13-May-13	Chris Crouch Joe Stokes	SB14	Hotplate # 2	Heat from furnace assembly - burns injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Hotplate # 3	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Hotplate # 3	Heat from furnace assembly - burns injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Leitz Microhardness tester	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Leitz Microhardness tester	Moving Indenter and base - severe injury	L	instruction of operator in use of equipment
13-May-13	Chris Crouch Joe Stokes	SB14	Report writing	desk height and Seating of students - posture injury	L	
13-May-13	Chris Crouch Joe Stokes	SB14	Report writing	lighting in laboratory - eye soreness	L	
13-May-13	Chris Crouch Joe Stokes	SB14	Zwick Z50 kN Material Testing Machine	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Zwick Z50 kN Material Testing Machine	Moving Parts - severe injury	L	Safety shield and interlock sw must be set
13-May-13	Chris Crouch Joe Stokes	SB14	Zwick Z50 kN Material Testing Machine PC	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	SB14	Zwick Z50 kN Material Testing Machine Monitor	Electric Shock - severe injury/death	L	All electrical circuits fused and components earthed
17-May-13	M. Tyrrell	SB16	Hand Tools	Impact, Cuts , Abrasions	L	Hand Tools maintained and Good Housekeeping, Instruction on Operating Procedure

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17-May-13	M. Tyrrell	SB16	Drilling M/c	Cuts, Abrasions, Foreign bodies in eyes,	L	Goggles, Regular maintenance of equipment, Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB16	Drilling M/c	Electric Shock - severe injury/death	L	220V AC socket outlets are protected by residual current devices (RCD's) with 30mA/30mSec sensitivity. Electrical Equipment Enclosed. Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB16	Hand operated Shears	Severe injury limb amputation, cuts	L	Guards enclose blade, Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB16	Hand Press	Severe injury crushed limbs, cuts	L	Guards enclose punch, Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB16	Folders	Severe injury crushed limbs,	L	Instruction on Operating Procedure.
17-May-13	M. Tyrrell	SB16	Power Supply	Mild Electric Shock	L	24Volts 3Amps
17-May-13	M. Tyrrell	SB16	Soldering Iron	Burns, no extraction fan	L	Instruction on Operating Procedure, limited usage does not warrant the need for extraction fan.
17-May-13	M. Tyrrell	SB16	Cutting fluid	Possible skin rash	L	Intermittently used therefore risk reduced, wash hands
17-May-13	M. Tyrrell	SB16	Eng Vice	Severe injury crushed limbs,	L	Instruction on Operating Procedure.
17-May-13	M. Tyrrell	SB16	Pneu. Climbing Device Fireman	Severe injury crushed limbs, fingers amputated	M	Instruction to keep hands clear when operating.
17-May-13	M. Tyrrell	SB16	Pneu.Climbing table	Air Line Connections severe injury		Instruction on Operating Procedure. Goggles
17-May-13	M. Tyrrell	SB16	Pneu.Climbing table	Electric Shock - severe injury/death		220V AC socket outlets are protected by residual current devices (RCD's) with 30mA/30mSec sensitivity. Electrical Equipment Enclosed. Instruction on Operating Procedure
5-Nov-04	D. McLoughlin	SB18	Bridgeport CNC Mill	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	Pro 2000 Semi-automatic mill	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment

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5-Nov-04	D. McLoughlin	SB18	Protturn Semi Automatic Lathe	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	Bridgeport Manual Mill	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	Harrison M300 Manual Lathe	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	Jones + Shipman Surface Grinder	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	Pedestal Grinder	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	Klaeger & Muller Saw	Hands, Clothes entangled in moving parts, potential for injury from moving blade	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	Startrite Band Saw	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	B T S125 Rolatruc	Potential for crushing injury	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	Quantum Pedestal Drill	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Training and/or supervision Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	Belt Sander	Injury from moving abrasive belt	Low	Training and/or supervision Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	Guyson Shotblast	Inhalation of dust particles	Low	Training and/or supervision Provide Personnel protective equipment

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5-Nov-04	D. McLoughlin	SB18	Morgan Rushworth Guillotine	Potential for crushing injury	Low	Training and/or supervision Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	Morgan Rushworth Bender	Potential for crushing injury	Low	Training and/or supervision Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB18	Fly Press	Potential for crushing injury	Low	Training and/or supervision Provide Personnel protective equipment
28-Apr-14	Jim Barry	SB18	SLX 1600 XYZ Proturm Semi-Automatic Lathe	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Operation only by trained and authorised personnel. Provide Personal protective equipment
28-Apr-14	Jim Barry	SB18	Scheppach Ts-31567 Circular Saw	Hands, Clothes entangled in moving parts, potential for injury from flying objects. Severe injury. Hearing damage.	High	Operation only by trained and authorised personnel. Provide Personal protective equipment
10-May-13	Michael May	S125	Motopol Semi automatic Specimen preparation unit	Risk from moving Parts	M	Two hand starting switch incorporated in machine. Operation of equipment to be carried out by trained personnell only
10-May-13	Michael May	S125	Simplet 2000 Mounting press	Danger from pressurised gas	L	Pressurised gas regulated. Operation of equipment to be carried out by trained personnell only
10-May-13	Michael May	S125	Abrasimet 2 circular saw	Risk from moving Parts	M	Rotating parts enclosed and protected by electrical interlock. Operation of equipment to be carried out by trained personnell only
18-Aug-04	Michael May	S125	Scancoat six sputter coater	Danger from high vacuum	M	Vacuum interlock switch and chamber microswitch in place. Operation of equipment to be carried out by trained personnell only

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8-Jan-13	Michael May	S124a	Scanning electron microscope	Danger from pressurised gas	L	Pressurised gas regulated. Unit regularly serviced. Operation of equipment to be carried out by trained personnel only
5-Nov-04	Keith Hickey	SB26	Computer Workstation	Overuse resulting in eye strain & bad posture, Electric Shock.	Low	University Procedures for Ergonomic Operation of Keyboard and Screen-based Equipment
5-Nov-04	Dermot Brabazon/ Evans Chikararaka	SB28	Nd:YAG laser	The laser: a. Skin burn; b. Eye burn; Beam delivery: Optics failure ; Laser process: Heavy loads, moving parts	M,M,L, M,L	The laser system has been fitted with a fully protective enclosure thereby making it a class 1 laser system. An integrated safety interlock system was put in place which disables the laser once breached. Emergency stop switches have also been incorporated into the system. Suitable Personal Protective Equipment – Nd:YAG goggles are available to all users and must be worn by everyone using the system. Optics adjustment tools are provided to avoid the user from using their bare hands. Supplied gloves are to be used during removal of damaged optics or regular cleaning of optics. An integrated safety interlock system was put in place which disables the motion system once breached. The motion system comes equipped with limit switches which can be programed to limit the motion in specified zones.
5-Nov-04	D. McLoughlin	SB26a	ARD Electro Discharge Machine	Electric Shock, inhalation of fumes	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB26a	Cincinnati Hawk CNC lathe	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB26a	Cincinnati Dart CNC mill	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment

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5-Nov-04	D. McLoughlin	SB26a	Stands Pedestal Drill	Hands, Clothes entangled in moving parts, potential for injury from flying objects	High	Training and/or supervision Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB26a	Co-Ordinate Measuring Machine		Low	Operation only by trained and authorized personnel. Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB26a	Broaching Machine	Injury from sharp edges	Low	Training and/or supervision Provide Personnel protective equipment
5-Nov-04	D. McLoughlin	SB28	Mechtronic Laser	Burn hazard, Eye damage	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
17-May-13	D. McLoughlin	SB28	Welding Equipment	Burn hazard, Eye damage	High	Operation only by trained and authorized personnel. Provide Personnel protective equipment
17-May-13	D. McLoughlin	SB28	Injection Moulder	Burn hazard, Eye damage	Low	Training and/or supervision Provide Personnel protective equipment
28-Apr-14	Jim Barry	SB28	Dewalt Chop Saw	Hands, Clothes entangled in moving parts, potential for injury from flying objects. Severe injury. Hearing damage.	High	Operation only by trained and authorised personnel. Provide Personal protective equipment
17-May-13	M. Tyrrell	SB29	Pneumatic Boards	Moving Parts	L	Pressure reduced to 4bar Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB29	Pneumatic Boards	Air Line Connections severe injury	L	Instruction on Operating Procedure. Goggles
17-May-13	M. Tyrrell	SB29	Electro Boards	Mild Electric Shock	L	24Volts 3Amps
17-May-13	M. Tyrrell	SB29	Electro Boards	Moving Parts	L	Pressure reduced to 4bar Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB29	Electro Boards	Air Line Connections severe injury	L	Instruction on Operating Procedure Goggles

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17-May-13	M. Tyrrell	SB29	Pneumatic Boards	Moving Parts		Pressure reduced to 4bar Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB29	Pneumatic Boards	Air Line Connections severe injury		Instruction on Operating Procedure.
17-May-13	M. Tyrrell	SB29	FMS Rig	Moving Parts	L	Guards in Place`Pressure reduced to 6bar Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB29	FMS Rig	Air Line Connections severe injury	L	Regular checks to ensure equipment not tampered with.
17-May-13	M. Tyrrell	SB29	FMS Rig	Power to PLC's & CPU's. Electric Shock - severe injury/death	L	3 phase/220V AC socket outlets are protected by residual current devices (RCD's) with 30mA/30mSec sensitivity. Equipment Enclosed.Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB29	Relay Rig	Moving Parts	L	Pressure Low. Slow Moving. Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB29	Relay Rig	Electric Shock	L	24Volts 3Amps 220V AC socket outlets are protected by residual current devices (RCD's) with 30mA/30mSec sensitivity. Electrical Equipment Enclosed. Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB29	Relay Rig	Air Line Connections severe injury	L	Regular checks to ensure equipment not tampered with. Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB29	Vibration Bowl	Electric Shock - severe injury/death	L	220V AC socket outlets are protected by residual current devices (RCD's) with 30mA/30mSec sensitivity. Equipment Enclosed. Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB29	FMS Rig	Power to PLC's & CPU's. Electric Shock - severe injury/death		220V AC socket outlets are protected by residual current devices (RCD's) with 30mA/30mSec sensitivity. Equipment Enclosed.Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB29	PLC Rig	Moving Parts	L	Pressure reduced to 4bar Instruction on Operating Procedure
17-May-13	M. Tyrrell	SB29	PLC Rig	Mild Electric Shock	L	24Volts 3Amps
17-May-13	M. Tyrrell	SB29	PLC Rig	Air Line Connections severe injury	L	Regular checks to ensure equipment not tampered with.

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8-May-13	M. Tyrrell	SB29	PLC Rig	Monitor falling from shelf	L	Secure by bolting
8-May-13	M. Tyrrell	SB29	Relay Rig	Mild Electric Shock		24Volts 3Amps
8-May-13	M. Tyrrell	SB29	Vibration Bowl	Electric Shock - severe injury/death		220V AC socket outlets are protected by residual current devices (RCD's) with 30mA/30mSec sensitivity. Equipment Enclosed. Instruction on Operating Procedure
8-May-13	Michael May/Yan Delauré	SB32	Air conditioning unit A660	Risk from moving parts	Low	Moving parts enclosed in unit
8-May-13	Michael May/Yan Delauré	SB32	Air conditioning unit A660	Risk of burning from hot water or heating elements	Low	Heaters are enclosed and thermostatically controlled. Warning signs are in place.
8-May-13	Michael May/Yan Delauré	SB32	Air conditioning unit A660	Risk from pressurised gas	Low	High pressure cut out device and internally mounted relief valves in place. Annual test of High pressure cut out to be performed annually
8-May-13	Michael May/Yan Delauré	SB32	Flow in pipes network C11	Risk from water borne infections	Low	Water emptied from unit during periods of non use
8-May-13	Michael May/Yan Delauré	SB32	Heat exchanger H951	Burning from hot water or heating elements	Low	Heating elements enclosed and hot parts lagged or enclosed. Water heater thermostatically controlled
8-May-13	Michael May/Yan Delauré	SB32	Refrigeration cycle demonstration unit	Risk from pressurised gas	Low	High pressure cut out device and internally mounted relief valves in place

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8-May-13	Michael May/Yan Delauré	SB32	Refrigeration cycle demonstration unit	Risk from pressurised gas	Low	High pressure cut out device and internally mounted relief valves in place. Annual test of High pressure cut out to be performed annually
8-May-13	Michael May/Yan Delauré	SB32	Refrigeration cycle demonstration unit	Electric shock	Low	Annual testing of Residual current circuit breaker (RCCB) to be performed
8-May-13	Michael May/Yan Delauré	SB32	Volumetric bench H1d	Risk from water borne infections	Low	Water emptied from unit during periods of non use
8-May-13	Michael May/Yan Delauré	SB32	Centrifugal pump	Risk from moving parts	Low	Moving parts enclosed in unit
8-May-13	Michael May/Yan Delauré	SB32	Centrifugal pump	Risk from water borne infections	Low	Water emptied from unit during periods of non use
8-May-13	Michael May/Yan Delauré	SB32	Centrifugal pump	Risk filling water tank in close proximity to electric power unit	Low	Ensure that power is disconnected before filling tank
8-May-13	Michael May/Yan Delauré	SB32	Heat Pump R831	Risk from pressurised gas	Low	High pressure cut out device and internally mounted relief valves in place. Annual test of High pressure cut out to be performed annually
8-May-13	Michael May/Yan Delauré	SB32	Heat Pump R831	Electric shock	Low	Annual testing of Residual current circuit breaker (RCCB) to be performed

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8-May-13	Michael May/Yan Delauré	SB32	Flow visualisation system F14	Risk from water borne infections	Low	Water emptied from unit during periods of non use
8-May-13	Michael May/Yan Delauré	SB32	Laminar flow table C10	Risk from water borne infections	Low	Water emptied from unit during periods of non use
18-Aug-04	Michael May/Yan Delauré	SB32	Free and forced convection unit H920	Risk of burning from hot plates	Low	Hot surface warning signs in place
7-Nov-06	Michael May/Yan Delauré	SB32	Horizontal Axis Wind Turbine	Risk from turbine structure falling over	Medium	The turbine should be secured to the floor or stabilised
18-Aug-04	Michael May/Yan Delauré	SB32	Horizontal Axis Wind Turbine	Risk of electric shock	Low	The turbine rotor be fixed to avoid any rotation and current generation
28-Apr-14	Michael May	SB32	Dead Leg Fluid pipe System	Risk of Burning from Hot Water	Medium	Water heating is thermostatically controlled with a maximum temperature of 60°C
28-Apr-14	Michael May	SB32	Dead Leg Fluid pipe System	Risk of burning from Heating Element	Medium	Heating element is submerged in water and is thermostatically controlled. A lid is in place to cover the tank
28-Apr-14	Michael May	SB32	Dead Leg Fluid pipe System	Risk from Electrical Shock	Medium	Electrics installed by a qualified electrician
28-Apr-14	Michael May	SB32	Rheology international series 2 viscometer	Minimal risk from moving Parts	Low	Provide instruction to user on Operating Procedure
13-May-13	Keith Hickey	SB33	Computer Workstation	Overuse resulting in eye strain & bad posture, Electric Shock.	Low	University Procedures for Ergonomic Operation of Keyboard and Screen-based Equipment

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13-May-13	Dermot Brabazon	SB27	Rapid Prototyper	Lung exposure to dust from powders used in the process.	L	Unit is protected by Residual Circuit Breaker. Needs sign of on training before student can use this.
13-May-13	Keith Hickey	SB38	Computer Workstation	Overuse resulting in eye strain & bad posture, Electric Shock.	Low	University Procedures for Ergonomic Operation of Keyboard and Screen-based Equipment
13-May-13	Keith Hickey	SB38	Computer Workstation	Overuse resulting in eye strain & bad posture, Electric Shock.	Low	University Procedures for Ergonomic Operation of Keyboard and Screen-based Equipment
13-May-13	Keith Hickey	SB39	Computer Workstation	Overuse resulting in eye strain & bad posture, Electric Shock.	Low	University Procedures for Ergonomic Operation of Keyboard and Screen-based Equipment
28-Apr-14	Richard O'Connor / GMcG / LD	SB39	Circular knitting machine	Non authorised personnel using machine	Low	No unauthorised users can use machine- Main power switch can be locked out in off position via padlock, only trained users have access to key
28-Apr-14	Richard O'Connor / GMcG / LD	SB39	Circular knitting machine	Knitting head-Body part coming in contact with moving needle head during operation. Stab wound to contact areas	Low	Safety guard around needle head. Emergency stop positioned beside needle head.
28-Apr-14	Richard O'Connor / GMcG / LD	SB39	Circular knitting machine	Tensioner-Rotating components of tensioner pulling loose clothing or limbs/digits into machine resulting in crush injury.	Low	Wear tight fitting clothing when operating machine. Long hair should be secured by a hat or hairnet. Safety screens to be kept closed during use.

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28-Apr-14	Richard O'Connor / GMcG / LD	SB39	Circular knitting machine	Electronic controller- Electric shock from controller, burn	Low	Electric controller is housed in a locked cabinet. Should only be accessed by qualified personnel.
28-Apr-14	Richard O'Connor / GMcG / LD	SB39	Circular knitting machine	Mechanical component breaking off machine- damage to machine, property or operator	Low	Regular maintenance of machine. Inspection of moving parts before use.
13-May-13	Chris Crouch Paul Young	SG22	Centrifugal apparatus # 1	rotating parts - personal injury	Low	
13-May-13	Chris Crouch Paul Young	SG22	Centrifugal Speed control	Electric Shock - severe injury/death	Low	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Paul Young	SG22	Centrifugal Speed Tachometer	Electric Shock - severe injury/death	Low	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Paul Young	SG22	Centrifugal apparatus # 2	moving parts - severe injury	Low	Safety shield and interlock sw must be set to start
13-May-13	Chris Crouch Paul Young	SG22	Centrifugal Speed control	Electric Shock - severe injury/death	Low	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Paul Young	SG22	Centrifugal Speed Tachometer	Electric Shock - severe injury/death	Low	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Paul Young	NG12	Slipping Friction Apparatus # 1	rotating parts - personal injury	Low	Safety cover supplied
13-May-13	Chris Crouch Paul Young	NG12	Slipping Friction Apparatus # 1	Specimen Metal Tubes - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	NG12	Slipping Friction Apparatus # 1	Electric Shock - severe injury/death	Low	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Paul Young	NG12	Slipping Friction Apparatus # 2	rotating parts - personal injury	Low	Safety cover supplied

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13-May-13	Chris Crouch Paul Young	NG12	Slipping Friction Apparatus # 2	Specimen Metal Tubes - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	NG12	Slipping Friction Apparatus # 2	Electric Shock - severe injury/death	Low	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Paul Young	SG22	Pulley Apparatus #1	Incorrect use of pulley apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Pulley Apparatus #1	incorrect use of weights - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Pulley Apparatus #2 inhouse	Incorrect use of pulley apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Pulley Apparatus #2 inhouse	incorrect use of weights - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Flywheel Apparatus # 1	Incorrect use of Flywheel apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Flywheel Apparatus # 1	incorrect use of weights - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Flywheel Apparatus # 1	Protruding from wall - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Flywheel Apparatus # 2	Incorrect use of Flywheel apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Flywheel Apparatus # 2	incorrect use of weights - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Flywheel Apparatus # 2	Protruding from wall - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Compound Pendulum # 1	moving parts - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Compound Pendulum # 1	Protruding from wall - severe injury	Low	instruction of operator in use of equipment

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13-May-13	Chris Crouch Paul Young	SG22	Compound Pendulum # 2	moving parts - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Compound Pendulum # 2	Protruding from wall - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Friction on Inclined Plane Appt # 1	Incorrect use of Inclined Plane apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Friction on Inclined Plane Appt # 1	incorrect use of weights - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Friction on Inclined Plane Appt # 2	Incorrect use of Inclined Plane apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Friction on Inclined Plane Appt # 2	incorrect use of weights - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Equilibrium of Forces Apparatus # 1	Incorrect use of apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Equilibrium of Forces Apparatus # 1	incorrect use of weights - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Equilibrium of Forces Apparatus # 2	Incorrect use of apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Equilibrium of Forces Apparatus # 2	incorrect use of weights - severe injury	Low	instruction of operator in use of equipment

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13-May-13	Chris Crouch Paul Young	SG22	Forces and Couples Apparatus # 1	Incorrect use of apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Forces and Couples Apparatus # 1	incorrect use of weights - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Forces and Couples Apparatus # 2	Incorrect use of apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Forces and Couples Apparatus # 2	incorrect use of weights - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Crank and Con Rod apparatus # 1	moving parts - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Crank and Con Rod apparatus # 2	moving parts - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Gyroscope Apparatus # 1	rotating parts - personal injury	Low	Safety shield and interlock sw must be set to start
13-May-13	Chris Crouch Paul Young	SG22	Gyroscope # 1 speed control x 2	Electric Shock - severe injury/death	Low	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Paul Young	SG22	Gyroscope # 1 Tachometer	Electric Shock - severe injury/death	Low	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Paul Young	SG22	Gyroscope Motor pendulum # 1	rotating parts - personal injury	Low	Safety shield and interlock sw must be set to start
13-May-13	Chris Crouch Paul Young	SG22	Gyroscope Apparatus # 2	rotating parts - personal injury	Low	Safety shield and interlock sw must be set to start

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
13-May-13	Chris Crouch Paul Young	SG22	Gyroscope # 2 PSU	Electric Shock - severe injury/death	Low	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Paul Young	SG22	Gyroscope # 2 Tachometer	Electric Shock - severe injury/death	Low	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Paul Young	SG22	Gyroscope Motor pendulum # 2	rotating parts - personal injury	Low	Safety shield and interlock sw must be set to start
13-May-13	Chris Crouch Paul Young	SG22	Geartrain Apparatus # 1	moving parts - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Geartrain Apparatus # 2	moving parts - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Mechanisms apparatus # 1 Single & double toggle	Incorrect use of apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Mechanisms apparatus # 2 Single & double toggle	Incorrect use of apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Mechanisms apparatus # 3 Scotch Yoke	Incorrect use of apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Mechanisms apparatus # 4 Quick return	Incorrect use of apparatus - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Mechanisms apparatus # 5 Quick return	Incorrect use of apparatus - severe injury	Low	instruction of operator in use of equipment

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
13-May-13	Chris Crouch Paul Young	SG22	Static and Dynamic Balance Appt	rotating parts - personal injury	Low	Safety shield and interlock sw must be set to start
13-May-13	Chris Crouch Paul Young	SG22	Satic Appt Speed Control Unit	Electric Shock - severe injury/death	Low	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Paul Young	SG22	Static and Dynamic Balance Appt	Incorrect use Ball bearings - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Plate Clutch Friction Appt	Incorrect use of apparatus - severe injury	Low	Incorrect use of apparatus
13-May-13	Chris Crouch Paul Young	SG22	Plate Clutch Friction Appt	incorrect use of weights - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Plate Clutch Friction Appt	Protruding from wall - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Planetary Gear Demonstration Appt	rotating parts - personal injury	Low	Safety shield and interlock sw must be set to start
13-May-13	Chris Crouch Paul Young	SG22	Scales	Incorrect use of apparatus - severe injury	Low	Incorrect use of apparatus
13-May-13	Chris Crouch Paul Young	SG22	Report writing	desk height and Seating of students -bad posture	Low	
13-May-13	Chris Crouch Paul Young	SG22	Forced Vibration Apparatus	Moving bar and spring - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Forced Vibration PC and monitor	Electric Shock - severe injury/death	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Forced Vibration LVDT display	Electric Shock - severe injury/death	Low	instruction of operator in use of equipment

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
13-May-13	Chris Crouch Paul Young	SG22	Forced vibration Speed control power supply	Electric Shock - severe injury/death	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Forced vibration eccentric pulley and motor	rotating parts - personal injury	Low	instruction of operator in use of equipment
	Chris Crouch Paul Young	SG22	Forced Vibration mobile frame	Handling and moving frame - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Free Vibration Apparatus	Moving bar and spring - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Free Vibration PC and monitor	Electric Shock - severe injury/death	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Free Vibration LVDT display	Electric Shock - severe injury/death	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Free Vibration weights	incorrect use of weights - severe injury	Low	instruction of operator in use of equipment
13-May-13	Chris Crouch Paul Young	SG22	Free Vibration Apparatus	Handling and moving frame - severe injury	Low	instruction of operator in use of equipment
13-May-13						
13-May-13	Chris Crouch Joe Stokes	JG19	ESH 100 kN Fatigue Testing Machine	Electric Shock - severe injury/death	LOW	All electrical circuits fused and components earthed

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
13-May-13	Chris Crouch Joe Stokes	JG19	ESH 100 kN Fatigue Testing Machine	Moving Parts - severe injury	LOW	Safety shield and interlock sw must be set
13-May-13	Chris Crouch Joe Stokes	JG19	ESH 100 kN Fatigue Testing Machine PC	Electric Shock - severe injury/death	LOW	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	JG19	ESH 100 kN Fatigue Testing Machine Monitor	Electric Shock - severe injury/death	LOW	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	JG19	Torque Tension Testing Machine	Electric Shock - severe injury/death	LOW	All electrical circuits fused and components earthed
13-May-13	Chris Crouch Joe Stokes	JG19	Torque Tension Testing Machine	Moving Parts - severe injury	LOW	Safety shield and interlock sw must be set
23-Sep-10	Chris Crouch Joe Stokes	JG19	Torque Tension Testing Machine PC	Electric Shock - severe injury/death	LOW	All electrical circuits fused and components earthed
23-Sep-10	Chris Crouch Joe Stokes	JG19	Torque Tension Testing Machine Monitor	Electric Shock - severe injury/death	LOW	All electrical circuits fused and components earthed
23-Sep-10	Chris Crouch Joe Stokes	JG19	Instron 50kN Testing Machine	Electric Shock - severe injury/death	LOW	All electrical circuits fused and components earthed
23-Sep-10	Chris Crouch Joe Stokes	JG19	Instron 50kN Testing Machine	Moving Parts - severe injury	LOW	Safety shield and interlock sw must be set

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
23-Sep-10	Chris Crouch Joe Stokes	JG19	Instron 50kN Testing Machine PC	Electric Shock - severe injury/death	LOW	All electrical circuits fused and components earthed
23-Sep-10	Chris Crouch Joe Stokes	JG19	Instron 50kN Testing Machine Monitor	Electric Shock - severe injury/death	LOW	All electrical circuits fused and components earthed
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	JG20	Noise generated by the thermal spraying process	Stress, difficulty in communication, long term hearing loss, tinnitus	M for flame spray - H for plasma spray	The use of ear plug AND ear muffs by the user. Soundproof laboratory.
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	JG20	Radiant energy emitted by the flames.	Cataract, burns, arc-eye	L for flame spray - M for plasma spray	Placement of an anti-UV light protective curtain. The use of an adequate protective welding mask by the operator.
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	JG20	Fume and dust generated by the thermal spraying process.	Fire and explosion, toxic effects by inhalation, toxic effects by skin contact	L-H for all processes (Depends on Process/ Powders)	Placement of an extraction booth just in front of the spraying gun allowing removal of all airborne particulates and residual gases from gun that are not deposited onto the sample. The use of an adequate gas and particle filters mask by the operator. Personal protection includes: Gloves, Lab Coat, Goggles -prevent skin contact. Hoover available and Cleaning Procedure
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	JG20	Mechanical hazards	Trips and falls, Traverse Unit Movement	L for all processes	Safety features installed on the booth to accommodate cooling and power supply pipes that were hanging off the ground. Clear walk way space. Traverse Unit safety Mechanism
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	JG20	Electrical Hazard	Electric shock, explosion, fire, burns	L for all processes	The presence of an emergency cut-off switch at reach distance from the operator. Burn Spray for skin burns
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	JG20	Compressed gases	Unintended pressure release, manual handling, toxicity, fire and explosion	L for all processes	Placement of gas valves at an isolated area of the lab to avoid accidents. Temporary gas bottles will be placed in an trolley so avoid manual handling. Other gases stored outside building

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	JG20	Asphyxiant gases	Asphyxiation risk (inert gases such as nitrogen and argon)	L for all processes	Adequate air volume change by the air conditioning system. Oxygen sensor alarm above the spraying equipment. Extraction use, Gas Mask
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	JG20	Flammable gases	Fire and explosion risk (oxygen, acetylene, hydrogen)	L for flame spray - H for plasma spray (hydrogen)	Fire Alarm. Fire extinguisher
23-Sep-10	Ahmed Chebbi / Dr Joseph Stokes / Michael Tyrrell	JG20	Other general Items Raise by Sulzer Metco H&S representative following Maintenance/Calibration in August 2010	See Additional List Overleaf	L	Implement through Final Year Project 2010/2011
25-May-15	Owen Clarkin	N110b	Fritsch P3 planetary ball mill	Rotating parts - personal injury	L	Sealed unit with cut off switches (unit doesn't operate when open)
25-May-15	Owen Clarkin	N110b	Hettich Zentrifugen universal 320 Centrifuge	Rotating parts - personal injury	L	Sealed unit with cut off switches (unit doesn't operate when open)
25-May-15	Owen Clarkin	N110b	Labconco -50degC Centrivap Coldtrap	Cold burn	L	Would require prolonged exposure. Latex gloves should be used when operating and operated only by trained personnel.
28-May-15	JC/AB/JS	AG48	PEM Fuel Cell testing	Hydrogen gas, flammable and explosive	M	Experienced user to handle equipment (>10 years); Smallest volume of hydrogen is being used; Hydrogen rated equipment is used; Large volume room used for experiments; Safety arrestor valves in place; PPE worn (Lab coat and safety glasses); Second researcher to assist with all experiments.
4-Jun-15	Michael May/Yan Delauré	SB32	Water Tunnel	Risk from structural damage to tunnel and possible projection of material	Low	Tunnel design to avoid pressure build up

Date	Assessment By	Location	Location /Equipment /Work Activity/ Operation	Occupational Hazards Identified: Effect	Risk L / M / H	Control/ Preventive measures in place
4-Jun-15	Michael May/Yan Delauré	SB32	Water Tunnel	Risk from large water spillage	Low	Water Tunnel to be located away from electrics on a wet floor with drains. No risk from water damage to pump as it can be used as a submersible pump and is electrically sealed.

Appendix 3: Safety Checklist

<h2 style="margin: 0;">School of Mechanical and Manufacturing Engineering</h2> <p style="margin: 5px 0 0 0;">Office and Laboratory Safety Checklist <i>Top 4 issues to be prioritised for action within agreed time frame</i></p>
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Area Inspected:	Date:
Inspector 1:	

1.0	HOUSEKEEPING	Y/N
1.1	Is the overall condition of room/area tidy with surplus items stored away safely?	
1.2	Are heavy items stored at an appropriate height for ease of manual handling?	
1.3	Are passageways, especially emergency exits, kept free of obstruction?	
1.4	Are floor coverings damaged or worn so as to be a tripping hazard?	
1.5	Are there trailing cables, which are likely to be a tripping hazard?	
1.6	Are filing cabinets anchored and interlocked (only 1 drawer opens at a time)?	
1.7	Are sufficient bins provided for rubbish, and are they emptied regularly?	
1.8	Are kettles, coffee machines, etc., securely fixed to avoid risk of scalds?	
1.9	Are areas cleaned regularly?	
1.10	ANY OTHER HOUSEKEEPING OBSERVATIONS	
2.0	ELECTRICAL SAFETY	
2.1	Are all plug tops and sockets in good condition (Insulating tape / broken plug tops / loose sockets etc. are unacceptable)	
2.2	Are there any multi-point adapters in use?	
2.3	Are all electrical leads / cables free from obvious damage (no exposed cores / frayed cables/ burn marks)	
2.4	Are electrical repairs carried out by trained and competent personnel only?	
2.5	ANY OTHER ELECTRICAL SAFETY OBSERVATIONS	
3.0	FIRE SAFETY	
3.1	Are Fire Wardens appointed for each floor of building	
3.2	Have Fire Wardens undergone training in respect of their duties	
3.3	Are fire exits & escape routes accessible and unimpeded	
3.4	Is a fire drill conducted at least annually?	
3.5	Do all personnel know where fire extinguishers are located	
3.6	Are all flammable materials stored securely in appropriate locations?	
3.7	Do all staff know the alternative escape routes in the event of fire?	
3.8	Are the escape routes clearly marked?	
3.9	ANY OTHER FIRE SAFETY OBSERVATIONS	
4.0	VDU ERGONOMICS	
4.1	Are all chairs in use at VDU stations fully adjustable (Height adjustable, backrest height adjustable, backrest tiltable)	

4.2	Do staff take regular breaks from display screen work (min 5 minutes in each hour)		
4.3	Is there adequate space underneath desks to swivel knees 90 degrees in each direction		
4.4	Are windows fitted with blinds to eliminate glare		
4.5	Where chairs have armrests are these adjustable		
4.6	Is the temperature in the office 17.5 degrees or above		
4.7	Are headphones provided for staff who spend extended time on the phone		
4.8	ANY OTHER VDU SAFETY OBSERVATIONS		
5.0	MANUAL HANDLING		
5.1	Are staff who routinely lift / Push / Pull loads trained in correct manual handling techniques		
5.2	Are ladders, kickalongs available to access higher shelving/storage space?		
5.3	Are trolleys / other manual handling aids available to transport loads		
5.4	ANY OTHER MANUAL HANDLING OBSERVATIONS		
6.0	EMERGENCY PREPAREDNESS		
6.1	Is a member of staff trained in occupational First Aid		
6.2	Is the First Aid box located in a prominent position – With contact details for First Aid Treatment		
6.3	Are all staff aware of what to do in the event of an emergency (requiring First Aid / Spotting a fire etc.)		
6.4	Is the Security Response Number prominently displayed for staff working out of hours?		
6.5	ANY OTHER OBSERVATIONS		
REMEDIAL MEASURES REQUIRED			
	List Issues For Rectification in order of Priority	Required Action	Responsible Person
			Before What Date?

Note 1: Readily resolved Issues should be rectified during the inspection process

Note 2: Time frame for rectification of prioritised issues must be agreed by management with responsible person

Inspector's Signatures: (1) _____ (2) _____

Date of next Scheduled Inspection: _____

Appendix 4: Health and Safety procedures in place in the School of Mechanical and Manufacturing Engineering

The following additional measures have been implemented by the School of Mechanical and Manufacturing Engineering.

- The School has produced a ‘School of Mechanical and Manufacturing Engineering, Undergraduate Laboratory Handbook’
- The School maintains a detailed list of all Chemicals used in Laboratory work. MSDS sheets are available within Labs for each Chemical. A Current list of Chemicals used in the School of Mechanical and Manufacturing Engineering is detailed in Appendix 5.
- The School of Mechanical and Manufacturing Engineering sources, stores and disposes of chemicals according to the processes and procedures outlined in the School of Mechanical and Manufacturing Engineering Safety Handbook.
- Final Year undergraduate students in the School undertake a Hazard and Risk Assessment of their Final Year Projects (FYP). This assessment is signed by the student, the relevant academic and technical staff members, and is subsequently uploaded to the Moodle FYP site.
- The School has developed a targeted Health and Safety Induction training programme, which is rolled out to new postgraduate (research) students.
- The School has developed a School of Mechanical and Manufacturing Engineering Safety Handbook, which is available electronically to all staff and students.
- The School of Mechanical and Manufacturing Engineering conducts regular Health and Safety audits. These audits will be carried out according to the School Safety Checklist shown in Appendix 3. Students are expected to have a copy of their current safety documentation to hand and are expected to produce this documentation when requested.
- The School of Mechanical and Manufacturing Engineering stores biohazards in designated and appropriately labelled fridges/freezers. This refrigeration equipment is calibrated annually as per EPA requirements.
- The School of Mechanical and Manufacturing Engineering disposes of biohazard materials, such as animal carcasses (whole/part), according to the procedures developed by the Biology Resource Unit (BRU) in Dublin City University – “Standard Operating Procedure-Disposal of Carcasses, revision 6”.

- The Engineering Workshop policies for the School of Mechanical and Manufacturing Engineering are detailed in the School of Mechanical and Manufacturing Engineering Safety Handbook.

Appendix 5: List of hazards/chemicals in the School of Mechanical and Manufacturing Engineering

1. BIOLOGICAL HAZARDS

2 FRIDGES and 2 FREEZERS have been designated for the storage of biological materials.
Location: SB13B

2. GAS CYLINDERS

Gas Bottle Count April 2015

Location	Apparatus	Gas Type	Size	Supplier	Quantity
SB28 LASER	LASER	ARGON	X50-230	AP	1
SB28 LASER	LASER	OXYGEN	X50	AP	1
SB28 WELDING	WELDING	OXYGEN	X10	AP	1
SB28 WELDING	WELDING	ACETELYNE	X10	AP	1
S125	SCAN COATER	ARGON	X10	AP	1
N110D	PYCNOMETER	HELIUM	X50	AP	1
N110B	TGA	NITROGEN	X30	AP	1
TOTAL					7
SB13A	SPARK ANALYSER	ARGON	W	BOC	1
SB13A	SPARK ANALYSER	NITROGEN	W	BOC	1
SB28 LASER	LASER	NITROGEN	W	BOC	3
SB28 LASER	LASER	ARGON	W	BOC	3
SB28 WELDING	WELDING	ARGON	W	BOC	3
AG20	FUEL CELL	NITROGEN	X	BOC	1
AG20	FUEL CELL	HYDROGEN	B	BOC	1
AG20	SHAHRIAR/WIRE WRAP	ARGON	W	BOC	1
NG10	BIOFUEL	NITROGEN	W	BOC	1
GAS STORES	HVOF	POWERJET PROP		BOC	2
N110B	TUBE FURNACE	ARGON	W	BOC	2
N110B	DILATOMETER	NITROGEN	W	BOC	1
N110B	GAS ANALYSER	OXYGEN	V	BOC	1
N110B	GAS ANALYSER	HELIUM	L	BOC	1
TOTAL					20

NOT ON FIGURES
ALSO AP BOTTLE IN CHEMISTRY

3. LIST OF CHEMICALS

The name and the location of the chemicals stored in the School of Mechanical and Manufacturing Engineering is reported as follows.

CHEMICAL	SYMBOL	CAS	Product Number	QUANTITY	EXPIRY DATE	SUPPLIER	ROOM	LOCATION
copper(I) Chloride 99%	CuCl	7758-89-6		300g		Alta aesar	N110b	Fume-hood 1
Calcium chloride(≥93%)	CaCl ₂	10043-52-4		500g		Sigma	N110b	Owen 1
Toluene	C ₆ H ₅ CH ₃	108-88-3		90mL/2L			N110b	Fume-hood 2
Ammonium hydroxide 99.8%	NH ₄ OH	1336-21-6		900mL		J.T.Baker	N110b	Fume hood 2
Dipentene, tech	C ₁₀ H ₁₆	138-86-3		4L		Aldrich	N110b	Fume-hood 2
Calcium carbonate	CaCO ₃	471-34-1		400g		Sigma	N110b	Owen 1
Calcium carbonate	CaCO ₃	471-34-1		200g		Sigma	N110b	Owen 1
Sodium carbonate(99,95-105%) anhydrous.	Na ₂ CO ₃	497-19-8		400g		Sigma-Aldrich	N110b	Owen 1
Zinc stearate, tech	[CH ₂ (CH ₂) ₁₆ COO] ₂ Zn	557-05-1		600g		Sigma-Aldrich	N110b	Fume-hood 2
Potassium carbonate	K ₂ CO ₃	584-08-7		400g		Sigma-Aldrich	N110b	Owen1
Citric acid monohydrate	HOC(COOH)(CH ₂ COOH) ₂ · H ₂ O	5949-29-1		10/150g		Merck Chemicals	N110b	Mustafa Sajjia
Citric acid monohydrate	HOC(COOH)(CH ₂ COOH) ₂ · H ₂ O	5949-29-1		200g		Sigma-Aldrich	N110b	Mustafa Sajjia
silicon dioxide	SiO ₂	60676-86-0		900kg		Sigma	N110b	Owen1
2-Propanol	(CH ₃) ₂ CHOH	67-63-0		2L	June 13,2009	Sigma-Aldrich	N110b	Fume-hood 2
Mercury Estandar for AAS	Hg	7439-97-6		900mL	DEC/15	Sigma-Aldrich	N110b	Hassan's cabinet
Sodium phosphate dibasic	Na ₂ HPO ₄	7558-79-4		500g		Sigma-Aldrich	N110b	Owen 1
Sodium phosphate dibasic	Na ₂ HPO ₄	7558-79-4	S7907-1KG	250grms		Sigma-Aldrich	N110b	Owen 1
Hydrochloric acid 36.5-38%	HCl	7647-01-0		700ml		Sigma-Aldrich	N110b	Fume-hood 1
Potassium bromide	KBr	7758-02-3		5/10g		Sigma-Aldrich	N110b	Owen1

CHEMICAL	SYMBOL	CAS	Product Number	QUANTITY	EXPIRY DATE	SUPPLIER	ROOM	LOCATION
Iron(III) nitrate nonahydrate	Fe(NO ₃) ₃ · 9H ₂ O	7782-61-8		2,5Kg		Sigma-Aldrich	N110b	Mustafa Sajjia
Iron(III) nitrate nonahydrate	Fe(NO ₃) ₃ · 9H ₂ O	7782-61-8		50/200g		Sigma-Aldrich	N110b	Fume-hood 1
Iron(III) nitrate nonahydrate 99.99+%	Fe(NO ₃) ₃ · 9H ₂ O	7782-61-8		1/2Kg		Sigma-Aldrich	N110b	Fume-hood 1
Aluminum nitrate nonahydrate	Al(NO ₃) ₃ · 9H ₂ O	7784-27-2		500g		Sigma-Aldrich	N110b	Owen1
Tetraethyl orthosilicate	Si(OC ₂ H ₅) ₄	78-10-4		800ml		Sigma-Aldrich	N110b	Fume-hood 2
2-Methyl-1-propanol	(CH ₃) ₂ CHCH ₂ OH	78-83-1		1,3L		Riedel-de Haën	N110b	Fume-hood 2
Sodium L-lactate	C ₃ H ₅ NaO ₃	867-56-1		5/10g		Sigma-Aldrich	N110b	Owen 1
Pectin from citrus peel		9000-69-5		30g		Sigma-Aldrich	N110b	Owen1
Poly(vinyl alcohol)87-89% hydrolyzed	[-CH ₂ CHOH-] _n	9002-89-5		200g		Sigma-Aldrich	N110b	Owen 1
Alginic acid sodium salt from algae		9005-38-3		20g		Sigma	N110b	Owen 1
Strontium chloride hexahydrate	SrCl ₂ · 6H ₂ O	10025-70-4		50/200g		Sigma-Aldrich	N110b	Owen 1
Calcium phosphate monobasic monohydrate	Ca(H ₂ PO ₄) ₂ · H ₂ O	10031-30-8		500g		Sigma	N110b	Owen 1
Calcium chloride solution	CaCl ₂	10043-52-4		700mL		Sigma	N110b	Owen 1
Zirconium(IV) silicate, 325 mesh	ZrSiO ₄	10101-52-7		1Kg		Sigma-Aldrich	N110b	Owen 1
Diethanolamine, 99%	HN(CH ₂ CH ₂ OH) ₂	111-42-2		900mL		Aldrich	N110b	Fume-hood 2
Yttrium methoxyethoxide	C ₉ H ₂₁ O ₆ Y	115668-57-0		100g		ABCR	N110b	Fume-hood 2
Gallium oxide	Ga ₂ O ₃	12024-21-4		5/10g		Absco	N110b	Owen 1
Ammonium Chloride	H ₄ CIN	12125-02-9		5/50g		Sigma-Aldrich	N110b	Atinuke
Ammonium Chloride	H ₄ CIN	12125-02-9		5/50g		Sigma-Aldrich	N110b	Atinuke
Calcium oxide	CaO	1305-78-8		900g	2011/08	J.T.Baker	N110b	Fume-hood 2
Sodium Hydroxide (pellets)	NaOH	1310-73-2		900g		Sigma-Aldrich	N110b	Fume-hood 2
Zirconium(IV) oxide	ZrO ₂	1314-23-4		5/10g		Sigma-Aldrich	N110b	Owen 1

CHEMICAL	SYMBOL	CAS	Product Number	QUANTITY	EXPIRY DATE	SUPPLIER	ROOM	LOCATION
Aluminum oxide	Al ₂ O ₃	1344-28-1		400g		Sigma-Aldrich	N110b	Owen 1
Aluminum oxide	Al ₂ O ₃	1344-28-1		500g		Sigma-Aldrich	N110b	Atinuke
Aluminum oxide	Al ₂ O ₃	1344-28-1		50/200g		Sigma-Aldrich	N110b	Atinuke
Calcium nitrate tetrahydrate	Ca(NO ₃) ₂ · 4H ₂ O	13477-34-4		300/500g		Sigma - Aldrich	N110b	Owen 1
Heptane anhydrous(99 %)	C ₇ H ₁₆	142-82-5		50mL		Sigma-Aldrich	N110b	Mustafa Sajjia
Sodium bicarbonate	NaHCO ₃	144-55-8		5kg		Acros	N110b	Trolley
Sodium bicarbonate 99,7%	NaHCO ₃	144-55-8		5Kg		Acros Organics	N110b	Trolley
D-(–)-Tartaric acid	HO ₂ CCH(OH)CH(OH)CO ₂ H	147-71-7		10/15g		Sigma-Aldrich	N110b	Owen1
Strontium carbonate	SrCO ₃	1633-05-2		300g		Sigma-Aldrich	N110b	Owen 1
2-Methoxyethanol 99.9+% HPLC	CH ₃ OCH ₂ CH ₂ OH	181-86-4		900mL		Aldrich	N110b	Fume-hood 2
Poly(vinyl-co-ethylene)	C ₄ H ₈ O	25067-34-9		10/20g		Sigma-Aldrich	N110b	Owen 1
Poly(ethylene glycol)	H(OCH ₂ CH ₂) _n OH	25322-68-3		400g		Sigma-Aldrich	N110b	Owen1
Sodium hexametaphosphate flakes	(NaPO ₃) ₆	301474G		300g		BDH	N110b	Fume-hood 1
Carbon nanotube		308068-56-6		1g		Sigma-Aldrich	N110b	Hassan's cabinet
Carbon nanotube		308068-56-6		250mg		Sigma-Aldrich	N110b	Hassan's cabinet
Sodium Carbonate	CNa ₂ O ₃	497-18-8		300g		SIGMA - ALDRICH	N110b	Owen 1
Glycerol 99.5+%	HOCH ₂ CH(OH)CH ₂ OH	56-81-5		400mL		Sigma-Aldrich	N110b	Fume-hood 1
Glycerol		56-81-5		1 lt		Sigma-Aldrich	N110b	
Glycerol		56-81-5		1 lt		Sigma-Aldrich	N110b	
Glycerol		56-81-5		1 lt		Sigma-Aldrich	N110b	
Glycerol		56-81-5		1 lt		Sigma-Aldrich	N110b	
Glycerol		56-81-5		1 lt		Sigma-Aldrich	N110b	
Glycerol		56-81-5		2 Lts		Fisher-Scientific	N110b	
Hexadecyltrimethylammonium	C ₁₉ H ₄₂ BrN	57-09-0		5g		Sigma-Aldrich	N110b	Mustafa Sajjia

CHEMICAL	SYMBOL	CAS	Product Number	QUANTITY	EXPIRY DATE	SUPPLIER	ROOM	LOCATION
bromide(99%)								
Stearid acid	C18H36O2	57-11-4		5g		Sigma-Aldrich	N110b	Fume-hood 2
Citric acid monohydrate pro analysi	HOC(COOH)(CH ₂ COOH) ₂ · H ₂ O	5949-29-1		500g		Sigma-Aldrich	N110b	Mustafa Sajjia
Citric acid monohydrate pro analysi	HOC(COOH)(CH ₂ COOH) ₂ · H ₂ O	5949-29-1		400g		Sigma-Aldrich	N110b	Mustafa Sajjia
Ethenol	C ₂ H ₅ OH	603-002-00-5		300mL		Merck	N110b	Fume-hood 2
Ethanol	CH ₃ CH ₂ OH	64-17-5		300mL	22/08/2011	BDH	N110b	Fume-hood 2
Acetic Acid	C ₂ H ₄ O ₂	64-19-7		200mL		Sigma-Aldrich	N110b	Fume-hood 1
Methanol	CH ₄ O	67-56-1		1,7L		Fluka	N110b	Fume-hood 2
Methanol	CH ₄ O	67-56-1		2,5L		Fluka	N110b	Fume-hood 2
Methanol	CH ₄ O	67-56-1		1,2L		Lab-Scan	N110b	Fume-hood 2
2-Propanol puris(iso-propyl alcohol)		67-63-0		500mL		Riedel-de Haën	N110b	Trolley
Acetone	C ₃ H ₆ O	67-64-1		1,5L		Fisher Chemicals	N110b	Fume-hood 2
Dimethyl sulfide	C ₂ H ₆ S	67-68-5		50mL		Sigma-Aldrich	N110b	Fume-hood 2
1-Butanol(99,8%)	C ₄ H ₁₀ O	71-36-3		50mL		Sigma-Aldrich	N110b	Fume-hood 2
Nickel metal powder		7440-02-0		150g		Fisher Chemicals	N110b	Hassan's cabinet
Chromium	Cr	7440-47-3		5/30g		Sigma-Aldrich	N110b	Atinuke
Chromium	Cr	7440-47-3		5/30g		Sigma-Aldrich	N110b	Atinuke
Phosphoric acid	H ₃ PO ₄	7664-38-2		4L		J.T.Baker	N110b	Fume-hood 2
Phosphoric acid(85%)	H ₃ PO ₄	7664-38-2		3L		J.T.Baker	N110b	Fume-hood 2
Nitric acid	HNO ₃	7697-37-2		10/250mL		Sigma-Aldrich	N110b	Fume-hood 1
Nitric acid 70%	HNO ₃	7697-37-2		5/100mL	Mar-11	Sigma-Aldrich	N110b	Fume-hood 1
Nitric acid standard solution 1N in H ₂ O	HNO ₃	7697-37-2		10/450mL		Sigma-Aldrich	N110b	Fume-hood 1
Nitric acid60%	HNO ₃	7697-37-2		900mL	Mar-11		N110b	Fume-hood 1

CHEMICAL	SYMBOL	CAS	Product Number	QUANTITY	EXPIRY DATE	SUPPLIER	ROOM	LOCATION
Hydrogen peroxide solution 30%	H ₂ O ₂	7722-84-1		30ml		BDH / GPR™	N110b	Fume-hood 2
Graphite		77-82-5		500g		Sigma-Aldrich	N110b	Hassan's cabinet
Iron(III)-nitrate Nonahydrate, (>=98%)	Fe(NO ₃) ₃ · 9H ₂ O	7782-61-8		2Kg		Sigma-Aldrich	N110b	Mustafa Sajjia
Calcium fluoride(99-102,05%)	CaF ₂	7789-75-5		1KG		Sigma-Aldrich	N110b	Owen 1
Calcium hydrogen-phosphate	H ₂ CaO ₄ · 2H ₂ O	7789-77-7		50g/500g		Sigma-Aldrich	N110b	Owen 1
Alginate acid from brown algae	(C ₆ H ₈ O ₆) _n	9005-38-7		40g		Sigma	N110b	Owen 1
Poly(Vinyl Alcohol) Hydrolyzed		900-89-5		500grms		Sigma-Aldrich	N110b	
Triton X-14		9036-19-5		500ml		Sigma-Aldrich	N110b	Hassan's cabinet
D-(+)-Gluconic acid, lactone	C ₆ H ₁₀ O ₆	90-80-2		500g		Sigma-Aldrich	N110b	Owen 1
Arsenic standard				250ml	Nov/16	FLUKA	N110b	Hassan's cabinet
ETHANOL ABSOLUTE PRO-ANALYSIS	C ₂ H ₆ O			300ml	22/08/2011	BDH	N110b	Fume-hood 2
Litmus solution				500mL		Fisher Chemicals	N110b	Trolley
Selenium standard				200mL	April/16	FLUKA	N110b	Hassan's cabinet
D-Glucuronic acid, free acid	C ₆ H ₁₀ O ₇	6556-12-03		1KG		Biosynth AG	NG10	right shelf
Potassium Phosphate dibasic	K ₂ HPO ₄	04/11/7758		200g		Sigma-Aldrich	NG10	Right shelf
Sodium hydroxide	NaOH	1310-73-2		500g		VWR/BDH	NG10	Right shelf
Potassium phosphate dibasic trihydrate	K ₂ HPO ₄ · 3H ₂ O	16788-57-1		300g		Sigma-Aldrich	NG10	Right Shelf
Potassium phosphate dibasic trihydrate	K ₂ HPO ₄ · 3H ₂ O	16788-57-1		200g		Sigma-Aldrich	NG10	Right Shelf
Potassium phosphate dibasic trihydrate	K ₂ HPO ₄ · 3H ₂ O	16788-57-1		50g/100g		Sigma-Aldrich	NG10	Right Shelf
Sodium carbonate	Na ₂ CO ₃	497-19-8		2Kg		Sigma-Aldrich	NG10	Right shelf
Sodium chloride	NaCl	7647-14-5		2,5Kg		Sigma-Aldrich	NG10	Right shelf

CHEMICAL	SYMBOL	CAS	Product Number	QUANTITY	EXPIRY DATE	SUPPLIER	ROOM	LOCATION
Cobalt(II) oxide mesh 325	CoO	1307-96-6		20g		Sigma-Aldrich	NG10	Right shelf
Sodium azide Natriumazid(≥ 99%)	N ₃ Na	26628-22-8		85g		Sigma-Aldrich	NG10	Right shelf
Sodium Sulphate Anhydrous	Na ₂ SO ₄	7757-82-6		1KG		Sigma-Aldrich	NG10	Right shelf
Potassium Phosphate monobasic (Solution A powder)	H ₂ KO ₄ P	7778-77-0		50g		Sigma-Aldrich	NG10	Right shelf
Potassium Phosphate monobasic (Solution A powder)	H ₂ KO ₄ P	7778-77-0		10g		Sigma-Aldrich	NG10	Right shelf
Potassium Phosphate monobasic (Solution A)	H ₂ KO ₄ P	7778-77-0		500g		Sigma-Aldrich	NG10	Right shelf
Antifoam Y-30 Emulsion		A6457		70/80g		Sigma-Aldrich	NG10	Ridht shelf
Total Protein Reagent		T1949		5/30mL		Sigma-Aldrich	NG10	Right shelf
Calcium Hydroxide		1305-62-0		4.5kg		Riedel-de Haen	NG12	
Z-Max INFILTRANT RESIN		http://mpf.aap.cornell.edu/mpf/msds/s-hop/annex_supplies/z_corp_hardener.pdf		790g		Z Corporation	NG12	
POR-A-MOLD 2030 CURATIVE		http://www.sunbeltmaterials.com/2040.htm		2 kg		Synair	NG12	
POR-A-MOLD 2030 PREPOLYMER		http://www.sunbeltmaterials.com/2040.htm		2 kg		Synair	NG12	
Z-Max INFILTRANT HARDENER		http://www.3dsystems.com/company/datafiles/22-83106-S12-00-A-SDS-GHS-English-StrengthMax-and-Z-Max-90-Hardener.pdf		390gms		Z Corporation	NG12	
SUCROSE		57-50-1	S-7903	140g		Sigma-Aldrich	NG12	
Carbonyleisen pulver CS		7439-89-6		6Kg		Imhoff & Stahl	NG12	

CHEMICAL	SYMBOL	CAS	Product Number	QUANTITY	EXPIRY DATE	SUPPLIER	ROOM	LOCATION
(Carbonyl Iron Powder)						Gmbh		
Silicon Oil				0.5Lt			NG12	
Poly (vinyl alcohol)hydrolyzed		9002-89-5	341584-1kg	0.5kg		Sigma-Aldrich	NG12	
Paraplast Tissue Embedding Medium X-TRA		http://www.2spi.com/catalog/chem/paraplast.shtml		1kg		Tyco/Kendall	NG12	
Forane 141b Refrigerant from SB32 MM				150mls			NG12	
Iron(III) nitrate nonahydrate		7782-61-8		50g		Sigma-Aldrich	NG12	
Polycaprolactone		24980-41-4		600g		Sigma-Aldrich	NG12	
Hydroxylapatite Captal 60-1 SD				300g	06/11/2007	Plasma Biotol Ltd	NG12	
Sodium alginate		9005-38-3		120g		SAFC	NG12	
Silica				500g		Sigma-Aldrich	NG12	
Tosoh Zirconia TZ-3Y-E powder		http://www.tosoh.com/our-products/advanced-materials/zirconia-powders		300g		TOSOH	NG12	
Tosoh Zirconia TZ-3YB-E powder		http://www.tosoh.com/our-products/advanced-materials/zirconia-powders		800g		TOSOH	NG12	
Dow Corning Silicone Fluid Q7-9120		http://www.dowcorning.com/applications/search/products/Details.aspx?prod=01971557&type=PROD		400g		DOW Corning	NG12	
36% Glycerol in H2O				10L			NG12	

CHEMICAL	SYMBOL	CAS	Product Number	QUANTITY	EXPIRY DATE	SUPPLIER	ROOM	LOCATION
Various ER Rig Fluids Ref Harry Esmonde							NG12	
25 L Anodizing Rig Materials Ref Joe Stokes							NG12	
(Dimethylamino)pyridine 99%	C ₇ H ₁₀ N ₂	1122-58-3		50/100g		Sigma-Aldrich	SB13	Fume-hood 3
2-Methyl-1-propanol	(CH ₃) ₂ CHCH ₂ OH	78-83-1		0,5/1,5L		Riedel-de Haën	SB13	Cabinet
4Dimethylaminopyridin	C ₇ H ₁₀ N ₂	1122-58-3		90mL		Sigma-Aldrich	SB13	Fume-hood 3
Acetic acid	CH ₃ CO ₂ H	64-19-7		1L		Sigma-Aldrich	SB13A	Fume-hood 4
Acetic acid 99,7%	C ₂ H ₄ O ₂	64-19-7		2L		Sigma-Aldrich	SB13A	Locket cabinet
Acetone	C ₃ H ₆ O	67-64-1		1,2L		Fisher Chemicals	SB13	Cabinet
Acetone	C ₃ H ₆ O	67-64-1		2L		FLUKA	SB13	Cabinet
Acetone	CH ₃ COCH ₃	67-64-1		100mL		Fisher Chemicals	SB13A	Fume-hood 4
Acetone	C ₃ H ₆ O	67-64-1		0,5L		Sigma	SB13A	Fume-hood 4
Acetone	C ₃ H ₆ O	67-64-1		150mL		Fisher Chemicals	SB13A	Fume-hood 4
Acetone	C ₃ H ₆ O	67-64-1		2,5L		Fisher Chemicals	SB13A	Fume-hood 4
Acetone(>99,5%)	C ₃ H ₆ O	67-64-1		2,2L		FLUKA	SB13	Cabinet

CHEMICAL	SYMBOL	CAS	Product Number	QUANTITY	EXPIRY DATE	SUPPLIER	ROOM	LOCATION
Acetone(>99, 5%)	CH ₃ COCH ₃	67-64-1		2L		SIGMA	SB13	Cabinet
Beta tricalcium phosphate powder	Ca ₃ (PO ₄) ₂	Ident. Number: 6022		150/500g	19/03/2007	Plasma Biotol Ltd	SB13	C3
Beta tricalcium phosphate powder	Ca ₃ (PO ₄) ₂	Ident. Number: 6022		.5 kg	19/03/2007	Plasma Biotol Ltd	SB13	C3
Beta tricalcium phosphate powder	Ca ₃ (PO ₄) ₂	Ident. Number: 6022		.5 kg	19/03/2007	Plasma Biotol Ltd	SB13	C3
Beta tricalcium phosphate powder	Ca ₃ (PO ₄) ₂	Ident. Number: 6022		.5 kg	19/03/2007	Plasma Biotol Ltd	SB13	C3
Beta tricalcium phosphate powder	Ca ₃ (PO ₄) ₂	Ident. Number: 6022		.5 kg	19/03/2007	Plasma Biotol Ltd	SB13	C3
Beta tricalcium phosphate powder	Ca ₃ (PO ₄) ₂	Ident. Number: 6022		.5 kg	19/03/2007	Plasma Biotol Ltd	SB13	C3
Bouin's solution				1,5L		Sigma	SB13	Fume hood 3
Cadant(1:50)				40mL		Kühl-und Korrosionsschutzmittel	SB13	Sink
Chloroform	CHCl ₃	67-66-3		2L		Sigma-Aldrich	SB13A	Fume hood 4
Chloroform, anhydrous ≥99%	CHCl ₃	67-66-3		70mL		Sigma-Aldrich	SB13	Fume hood 3
Chromium(VI) oxide	CrO ₃	1333-82-0		200g		SIGMA - ALDRICH	SB13	Cabinet
Copper(II) sulfate pentahydrate	CuSO ₄ · 5H ₂ O	7758-99-8		100g		Riedel-de Haën	SB13A	Fume-hood 4
Dichloromethane	CH ₂ Cl ₂	75-09-2		5L		Fluka	SB13	C3
Dichloromethane	CH ₂ Cl ₂	75-09-2		0,5L		Fluka	SB13A	Fume hood 4
Dichloromethane ≥ 98.0%	CH ₂ Cl ₂	75-09-2		2,5L		Sigma-Aldrich	SB13	C3

CHEMICAL	SYMBOL	CAS	Product Number	QUANTITY	EXPIRY DATE	SUPPLIER	ROOM	LOCATION
Dimethyl sulfide(78,13 g/mol)	C2H6OS	67-68-5		2L		Riedel-de Haën.	SB13	Cabinet
Epoxy Curing agent				300ml		AKA Cure	SB13A	Shelf
Ethanol	CH3CH2OH	64-17-5		500mL		Sigma-Aldrich	SB13	Cabinet
Ethanol	CH3CH2OH	64-17-5		600mL		Merck Chemicals	SB13	Fume hood 3
Ethenol	C ₂ H ₅ OH	603-002-00-5		250mL		FLUKA	SB13A	Fume-hood 4
Ethylene glycol	HOCH2CH2OH	107-21-1		400mL		Riedel-de Haën	SB13A	Fume-hood 4
Formaldehyde 4% ACS solution	HCHO	50-00-0		4,5L	31-May-13	Gurr	SB13	Fumehood 3
Formaldehyde 4% ACS solution	HCHO	50-00-0		4/5L	31-May-13	Gurr	SB13	Fumehood 3
Formic acid (≥96)	CH2O2	64-18-6		2L		Sigma-Aldrich	SB13A	Locket cabinet
GPR Rectapur Glycerol 98%	C ₃ H ₈ O ₃	56-81-5		50mL		BDH	SB13A	Fume-hood 4
Griess reagent (modified)		G4410		50/100mL		Sigma-Aldrich	SB13	C2
Hydrochloric acid 37%	HCl	7647-01-0		200mL		Riedel-de Haën	SB13A	Locket cabinet
Hydrochloric acid 37%	HCl	7647-01-0		1,7L		Riedel-de Haën	SB13A	Locket cabinet
Hydrofluoric acid≥48%(wt)	HF	7664-39-3		1L		Sigma-Aldrich	SB13A	Locket cabinet
Hydrogen peroxide solution 30%	H ₂ O ₂	7722-84-1		1L		Sigma	SB13A	Fume-hood 4
Iron(III)chloride(97%)	Cl3Fe	7705-08-0		50g		Sigma-Aldrich	SB13A	Locket cabinet
Methanol	CH4O	67-56-1		5L		Lennox Laboratories supplies LTD	SB13	Cabinet
Methanol	CH4O	67-56-1		700mL	Feb 10,2013	FLUKA	SB13A	Shelf
Methanol	CH4O	67-56-1		1L		LAB SCAN	SB13A	Shelf
Methanol(>99,8%)	CH4O	67-56-1		2,3L	Feb 10,2013	FLUKA	SB13	Cabinet
Methanol(>99,8%)	CH4O	67-56-1		2l	Feb 10,2013	FLUKA	SB13	Cabinet
N-(3-Dimethylaminopropyl)-N-ethyl-carbodiimide hydrochloride(≥98%)	C5H17N3HCL	25952-53-8		5g		FLUKA	SB13	Cabinet
NaCl(0,9%)				100mL	2015-01	B/Braun	SB13	Sink

CHEMICAL	SYMBOL	CAS	Product Number	QUANTITY	EXPIRY DATE	SUPPLIER	ROOM	LOCATION
Nitric acid	HNO3	7697-37-2		2L		Sigma-Aldrich	SB13A	Locket cabinet
Nitric acid >69,0%	HNO3	7697-37-2		50mL		Fluka	SB13A	Locket cabinet
Oil Red O	C ₂₆ H ₂₄ N ₄ O	1320-06-5		100mL		Sigma-Aldrich	SB13	C3
Oxalic acid dihydrate	(COOH) ₂ *H ₂ O	6153-56-6		500g		Merck-Chemicals	SB13A	Locket cabinet
Phosphoric acid	H ₃ PO ₄	7664-38-2		EMPTY		SIGMA-ALDRICH	SB13	Cabinet
Pluronic F-127(power)	EO ₁₀₀ PO ₆₅ EO ₁₀₀	9003-11-6 * ²		500g/1Kg		Sigma-Aldrich	SB13	C3
Poly (vinyl alcohol), N-methyl-4(4'-formylstyryl)p Yri dinium methosulfate acetal(13,3%)	[-CH ₂ CHOH-] _n	9002-89-5		50g		Polysciences, Inc.	SB13	Cabinet
Poly (vinyl alcohol), N-methyl-4(4'-formylstyryl)p Yri dinium methosulfate acetal(13,3%)	[-CH ₂ CHOH-] _n	9002-89-5		20g		Polysciences, Inc.	SB13	Cabinet
Poly(1,4-butylene adipate-co-polycaprolactam)	C ₆ H ₁₀ O ₂	66139-31-4		5/50g		Sigma-Aldrich	SB13	C2
Poly(1,4-butylene adipate-co-polycaprolactam)	C ₆ H ₁₀ O ₂	66139-31-4		50/100g		Sigma-Aldrich	SB13	C2
Poly(vinyl alcohol)	[-CH ₂ CHOH-] _n	9002-89-5		200g		Sigma-Aldrich	SB13	C2
Poly(vinyl alcohol)+ 99% hydrolyzed	[-CH ₂ CHOH-] _n	9002-89-5		100		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		100g		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		400g		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		50g		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		5/50g		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		10g		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		10g		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		400g		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		200g		Sigma-Aldrich	SB13	C2

CHEMICAL	SYMBOL	CAS	Product Number	QUANTITY	EXPIRY DATE	SUPPLIER	ROOM	LOCATION
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		20/30g		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		50g		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		200g		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		200g		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		50/100g		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		50g		Sigma-Aldrich	SB13	C3
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		100g		Sigma-Aldrich	SB13	C3
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		100g		Sigma-Aldrich	SB13	C3
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		200g		Sigma-Aldrich	SB13	C3
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		250grms		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		250grms		Sigma-Aldrich	SB13	C2
Polycaprolactone	C ₆ H ₁₀ O ₂	24980-41-4		250grms		Sigma-Aldrich	SB13	C2
Polymethylmethacrylate powder (PMMA, acrylic)	[CH ₂ C(CH ₃)(CO ₂ CH ₃) _n]	9011-14-7		50/100g		Good fellow	SB13	C3
Potassium hydroxide	HKO	1310-58-3				Sigma-Aldrich	SB13	C2
Propan-2-ol	(CH ₃) ₂ CHOH	67-63-0				BDH	SB13A	Shelf
Silicone Elastomer		63394-02-5		20ml	20 OC 2009	Sylgard	SB13A	Shelf
Sodium Hydroxide (pellets)	NaOH	1310-73-2		400g		LENNOX	SB13A	Fume-hood 4
Sodium Hydroxide, ACS reagent, >+97.0% pellets	NaOH	1310-73-2		2/2,5Kg		Sigma-Aldrich	SB13	C2
Sodium Sulphate (Reagent Plus ≥99.0%)	Na ₂ SO ₄	7757-82-6		0,50/1,5kg		Sigma-Aldrich	SB13	C2
Sulfuric acid 97,5%	H ₂ SO ₄	7664-93-9		500g		Sigma-Aldrich	SB13A	Locket cabinet
Sulfuric acid(95-98%)	H ₂ SO ₄	7664-93-9		400mL		Sigma - Aldrich	SB13A	Locket cabinet
Trichloroethylene(≥99%)	C ₂ HCL ₃	EC.No 201-167-4		2L		BDH / GPR™	SB13	Cabinet
Tris (hydroxymethyl) aminomethane	NH ₂ C(CH ₂ OH) ₃	77-86-1		50/100g		Sigma-Aldrich	SB13	C3
Xylene Substitute	C ₆ H ₄ (CH ₃) ₂	1330-20-7		4L		Sigma-Aldrich	SB13	Sink

Appendix 6: Safety goals for 2015/16

1. Maintain the Health and Safety auditing schedule and conduct regular audits.
2. Implement Chemicals/hazardous materials management software.
3. Increase the Health and Safety awareness throughout the School.
4. Implement the Fire Safety Audit process.