Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

The Department of Mechanical, Manufacturing and Biomedical Engineering
and the
Trinity Centre for Biomedical Engineering

Safety Statement 2020/21

MMBE Website Version

Contents

General Statement of Department Safety Policy

It is the Department's policy to ensure, in so far as possible, the health, safety and welfare of all its staff and students in accordance with the College Safety Policy, the Safety, Health and Welfare at Work Act of 2005 and relevant, later, subsidiary legislation and statutory instruments. All reasonable steps will be taken to ensure that no persons – be it staff, students or others – health, safety and welfare is put at risk by, or as a result of the activities of the Department.

In so far as reasonably possible, adequate resources in relation to health, safety and welfare matters will be made available. All affected will receive the necessary, and up to date information, instruction and training and adequate levels of supervision for them to undertake activities in a safe manner. Both proactive and reactive approaches towards health, safety and welfare will be taken.

By achieving all the above, the Department will ensure that it meets its objectives for health, safety and welfare by:

- establishing a safe environment for all
- establishing and maintaining safe working procedures for staff and students
- encouraging health and safety as an integral part of work by all staff and students
- developing and maintaining a safety consciousness and a safety culture in all within the Department & Biomedical Engineering Centre
- conforming to the requirements laid down in the Safety, Health and Welfare at Work Act 2005, any further provisions made under the Act, other applicable legislation and the College Safety Statement, College Policies and Codes of Practice documents.

Signed:  (Ciaran Simms, Head of Discipline)

Date: 11th January 2021

COVID-19

COVID-19 Coordinator for MMBE - Chief Technical Officer, Mr. Michael Reilly (Ext.1557)

The Covid-19 pandemic is continuing to evolve and is likely to remain for some time yet. To remain in-line with University and Government guidelines, Mechanical, Manufacturing and Biomedical Engineering have introduced extra safety and hygiene measures.
If anything in this Safety Manual conflicts with the Covid-19 guidelines, the Covid-19 guidelines with take precedence. Where appropriate, Risk assessments and SOP's should all be updated to include Covid-19 procedures.

General MMBE Measures

For those of you who have yet to return to work on campus, we have a no. of procedures in place which we need you to carryout in order to get you settled back in safely.

You are required to complete the University Covid-19 Induction course and the local Covid-19 Induction Course which includes a quiz. The following link will instruct you on how to access the University Return to Work Induction Course

A recording of our Local Covid-19 Induction Course can be found on this link Covid-19 Induction Course Dept. of MME video Once viewed, please complete the following quiz Return to Work Safely Induction Course Dept. of MME Quiz

Swipe card access to the Parsons Building can be arranged through the Covid-19 Coordinator once you have completed the quiz.

A booking system (lab archives schedule) has been introduced for all labs and some of the research offices. You cannot enter the buildings unless you have booked a slot in your lab or office. Access to the lab archives schedule software will be granted once you have completed the induction courses.

Anyone returning to MMBE Buildings, labs or offices after a **2 week break or more** must complete the Pre-return to Work questionnaire

Face Coverings

Face coverings are now mandatory for all teaching and learning events for all students and staff, in all the Libraries and in internal public spaces on campus. A face covering is defined as 'a covering of any type which when worn by a person covers the person's nose and mouth'. Please comply with this requirement in order to reduce the spread of Covid-19.

Contacts Log

All staff and students are required by College to maintain a contacts log of the names of individuals you spend more than 15 minutes in close contacts (<2mtr) with.

Covid-19 Protocols

School of Engineering Covid-19 Protocols are to be followed by all MMBE staff and students. The latest University Covid-19 Key Updates will take priority where there is a conflict. As Dublin moves up and down through Levels 1 -5 of the National Framework for living with Covid-19, the MMBE Interim RoadMap will act as a guide to activity within MMBE while waiting on University guidance.

What do I do if I develop Covid-19 symptoms on campus?

- If unwell prior to coming on campus -please stay at home and don't come on campus.
- If a student/staff member develops symptoms of Covid-19 whilst on campus, as outlined in HSPC Guidance, the student/staff member should proceed to the Covid-19 isolation room and contact the College Health Centre by phone on the following number: **01-896 1556**.

Access & Local Rules

Main Office

- Levels 1 – 2 Access
    - 10am to 12pm, Mondays, Tuesdays and Thursdays only
    - Email of phone ahead where possible
    - One person at a time
    - Remain behind the counter/screen
    - Wait outside if someone is in this area
    - No face covering, no access
    - Staff – please lock the door after you
- Levels 3 – 5
    - No access
    - Staff working remotely, contact through email

Labs

- Levels 1 – 2
    - Timetabled teaching labs and tutorials
    - Pre-booked space for undergraduate and postgraduate projects
- Levels 3 – 4
    - Pre-booked space for PI approved undergraduate and postgraduate projects
- Level 5
    - High priority and Covid-19 related research
- Local lab rules need to be followed at all times
- Lab space/equipment needs to be pre-booked using lab archives scheduler

Workshop

- Levels 1 – 3
    - No access unless granted by a member of workshop staff
    - Completed jobs can be collected at the main door
        - You will be contacted when your parts are ready for collection.
    - All non-Workshop personnel are required to wear masks in the Workshop or when trying to access the Workshop.
- Levels 4 – 5
    - No access
    - Please contact Workshop Staff by phone or through email

Section 1 – Health and Safety

The purpose of this document is to provide information for all staff and students in the School while working in laboratories, offices on field trips. The health and safety of staff, students and visitors is important. The Safety, Health and Welfare at Work Act 2005 requires that you take all precautions, as far as is reasonably practicable, to avoid endangering yourself or others by your activities. The Health and Safety Statement and Codes of Practice for the Department areas are set out below and you must read, understand and abide by them. You are required to complete the appropriate Acknowledgement Form. Students and staff will be excluded from all laboratories and workshops until they have completed this Acknowledgement. This Departmental Safety Statement supplements the University Safety Statement and University Policies which are accessible on the Trinity College Dublin's website.

1.1 Scope of this statement

This statement covers people working in the following areas:

- The Parsons Building
- MMBE areas of the Watts building
- MMBE areas of TBSI
- MMBE office space in Trinity House

All members of MMBE must read and sign off on this document regardless of which building they work in. In addition, members of the MMBE working in buildings other than the Parsons Building, TBSI for instance, must read and sign off on the TBSI safety statement and comply with any local work practices there.

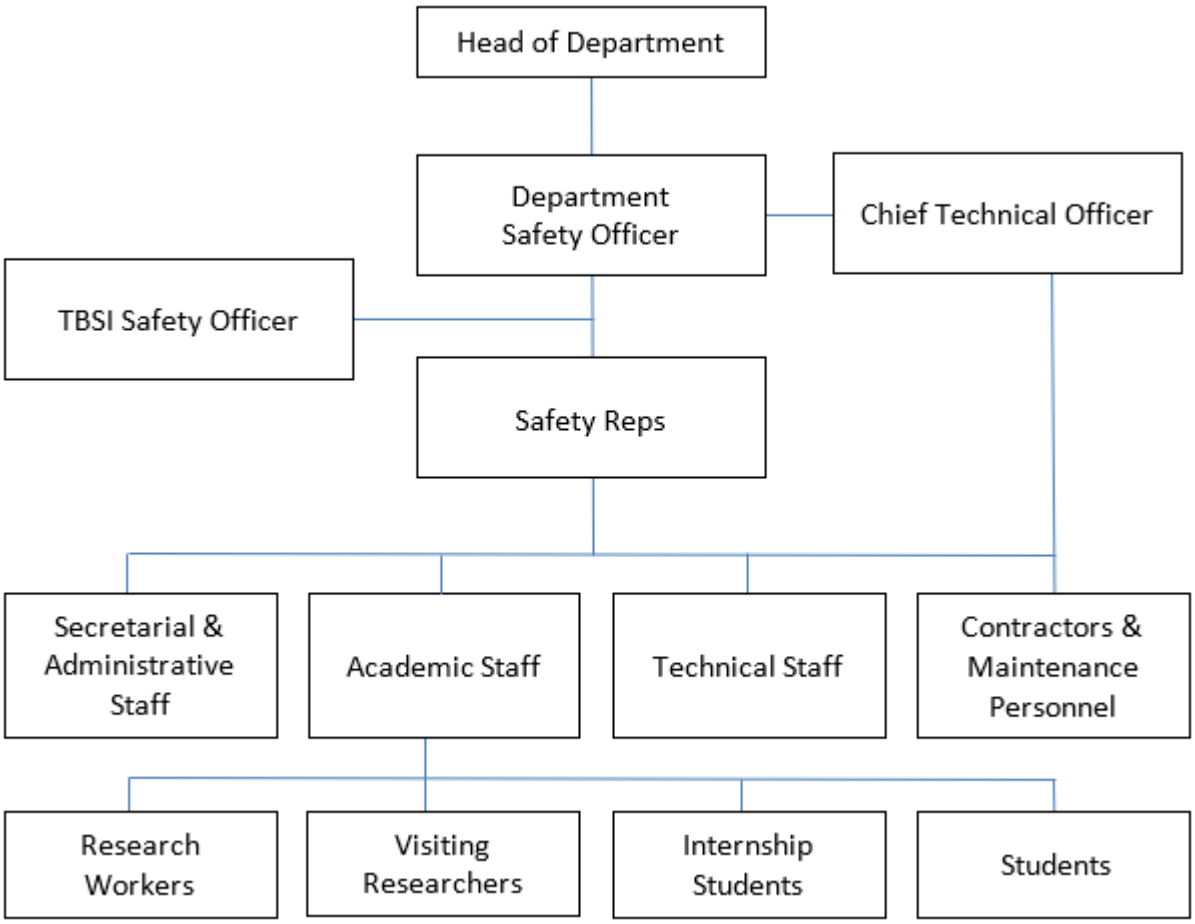
1.2 Safety responsibilities and duties

All personnel (staff, students and visitors) have a personal responsibility to ensure the health and safety of themselves and of others who may be affected by their activities within the Department.

1.3 Executive responsibilities

The Head of Department, Professor Ciaran Simms, is responsible for safety in the Department. He will appoint another member of the staff of the Department to act in his absence, and a record of the name of this acting Head of Department will be retained in the office of the Department. The Department Safety Officer is Mr. Gordon O'Brien. He has executive responsibility for safety and reports to the Head of Department. He is supported by Mr. Michael Reilly (Chief Technical Officer). If the Safety Officer is absent from the Department, the Chief Technical Officer will perform his safety duties & vice versa.

1.4 MMBE Health and Safety Structure



1.5 Health and Safety within MMBE

All personnel within the Department have a responsibility to contribute to the continuous monitoring of safety performance within the Department. On a day-to-day basis this can be achieved by forwarding comments, queries and concerns on safety matters to the Departmental Safety Officer or Chief Technical Officer.
Any deficiencies in equipment or procedures must be rectified promptly.
Where equipment is deemed to be unsafe **it must not be used** until corrective action is taken.

1.6 Risk Assessment

All members of the college must carry out a risk assessment where their work has the potential for harm to themselves and others. For multiple user equipment and machines, general risk assessments should be completed by an expert user. Individual users should understand reference these risk assessments when completing their own project risk assessments.
There are 4 basic steps to Risk Assessment.

- **Identify the hazards -** hazards are anything that can cause serious harm

- **Assess risk from these hazards** - the probability of harm occurring and to what degree of severity
- **Determine and implement relevant safety measures** - Your control measures are the most significant part of the risk assessment, as they set out the steps that must be followed to protect yourself and others
- **Assess residual risk** – any risk that remains after all the initial risk assessment is completed, refine control measures to account for this also

Risk assessment forms and guidance note on completing risk assessments can be found in Appendix A. Risk assessments that may need to be completed include:

- Equipment Risk Assessment
- Bio Project Risk Assessment
- Biological Agents Risk Assessment
- Pregnant Employees Risk Assessment

1.7 Risk Assessment Responsibility

Project risk assessments must be signed by the responsible PI.
Equipment RA's can be compiled by an expert user (Experimental Officer, Chief Technical Officer) but must be authorised(signed) by the relevant PI if their student wishes to use the said equipment.
Risk assessments should never be signed unless you are comfortable accepting responsibility in the event of an accident. Seek expert advice if required.

1.8 Identified Hazards

Several hazards have been identified in the Department. Details can be found in Appendix B.

Section 2 – General Safety Rules

2.1 Emergency 1999 (01 8961999)

The internal telephone number 1999 provides immediate access to professional assistance on a 24-hour basis.

Be prepared to state the:

1. Type of assistance required (ambulance, fire brigade, police etc.)
2. Type of emergency (fire, injury, etc.)
3. Name, extension number and location. (also, mobile number if possible)

If possible and safe to do so, keep close to the telephone, in order to give further information should it be required by the emergency services.

This number (1999) should only be used in an emergency.

The 24-hour Security Centre is at 1317 (01 896 1317) for non-emergency calls.

Department phone numbers relating to safety can be found here: MMBE Safety Contacts

2.2 General Safety Action

When you enter a building in the University, MMBE or otherwise:

- Find out how to get out in an emergency
- Know the location of the emergency evacuation assembly point
- Look for the fire safety equipment
- Know where the nearest alarm call point is
- Read the hazard information signs (fire, first aid, chemical, biological, radiation, laser etc.)

2.3 Fire Action

What to do if you discover a fire:

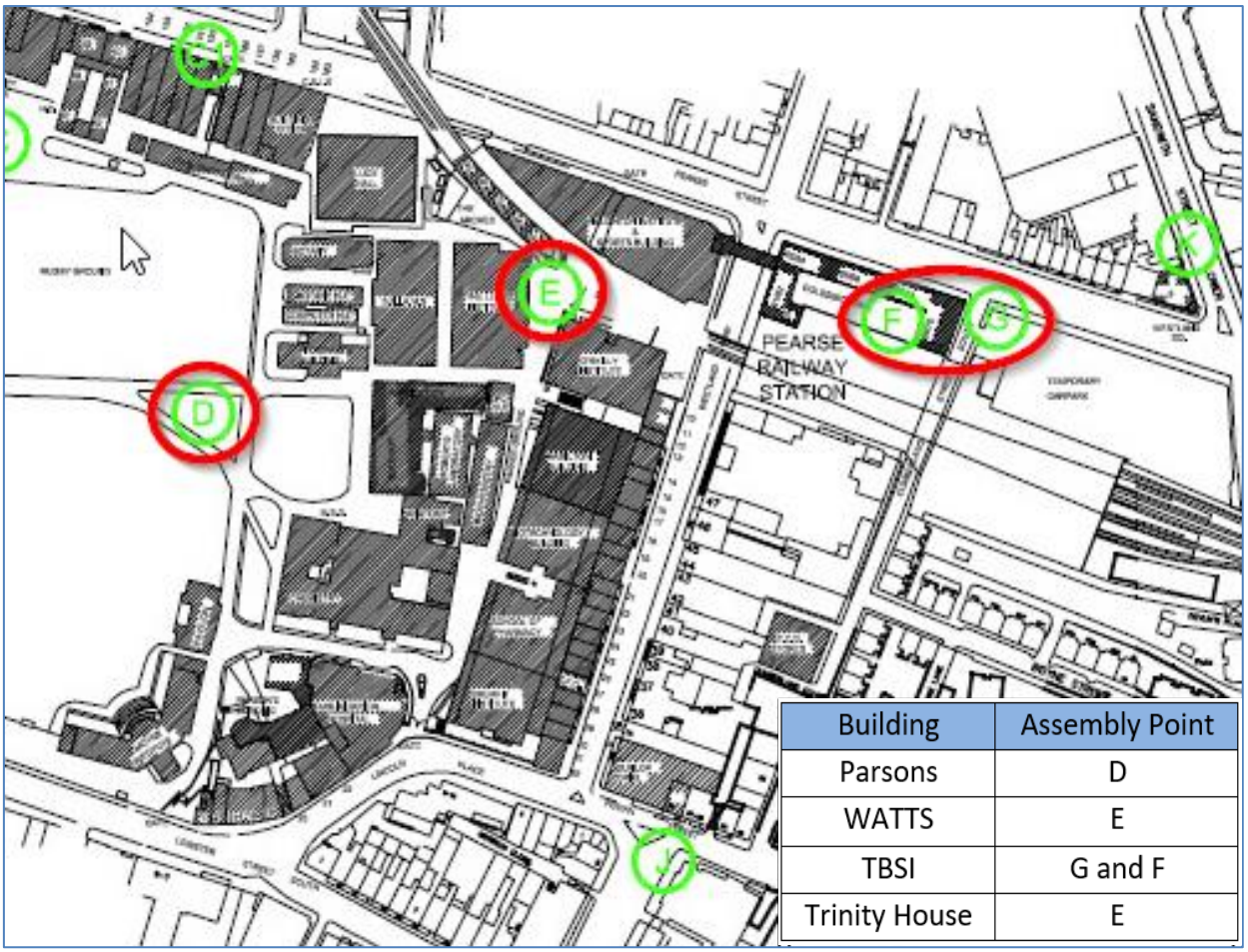
- Raise the alarm at the nearest break glass unit or alarm call point
- Leave your building immediately using the nearest exit route
- Do not use lifts
- Close doors behind you as you leave
- Do not take risks
- Notify Security at 1999 or mobile 01 896 1999, informing them that the alarm has been raised and in which area
- Notify a Fire Warden of your findings if there is one outside the building
- Report to your designated Assembly Point, do not congregate at the building entrance
    - **Parsons Building Point D**
        - Grass triangle (‘Flat Iron’) at east end of Boardwalk (College Park)

- **WATTS** **Point E**
  - Between the Lloyd and O'Reilly Buildings, near the Arches
- **TBSI** **Points G and F**
  - To the sides of the Institute on Cumberland St South and Sandwich Street
- **Trinity House** **Point E**
  - Between the Lloyd and O'Reilly Buildings, near the Arches

What to do if the fire alarm sounds

- Obey, promptly, all instructions given by the Fire Wardens/Safety Officer
- Leave your building immediately using the nearest exit route
- Do not use lifts
- Close doors behind you as you leave
- Do not take risks
- Move away from the building
- Report to your designated Assembly Point, do not congregate at the building entrance
- Do not re-enter building for any reason until authorised to do so and fire alarm is switched off

2.4 Fire Assembly Points for MMBE



Building	Assembly Point
Parsons	D
WATTS	E
TBSI	G and F
Trinity House	E

2.4 Fire drills

Fire drills are held twice during each calendar year and are attended by the College Fire Safety Officer and by members of the College Security Staff. Drills are held without prior-warning and during working hours when the building occupancy is likely to be high. Security staff check each building for defaulters before the all clear is given. A written record of each fire drill is maintained, indicating the date, the approximate number of persons evacuated from the building, and the time taken for complete evacuation.

2.5 Disabled Persons

There are no fire lifts installed in the Mechanical Engineering Dept. Available Lifts should NOT be used in the event of a Fire. Before entering the building Physically Disabled persons should be fully informed by their Host of the following procedures.
Progressive Horizontal Evacuation or Lateral Evacuation will be practiced. Physically Disabled occupants will be moved horizontally within the building away from the hazard. A 'Buddy System' should apply whereby the staff member concerned will be responsible for the disabled Visitor/Student. Disabled Visitor(s)/Student(s) may be left behind for the arrival of the fire brigade to execute complete evacuation. The staff member concerned must inform the fire service of the person's location.

2.6 Fire wardens

The Fire wardens for the Department are:

- Parsons Building
    - Judith Lee
    - Alex Kearns
    - Gerry Byrne
    - Peter O'Reilly
    - Gordon O'Brien
- MMBE labs in TBSI
    - TBA
- WATTS Building
    - Mark Culleton- Waiting on training

2.7 First Aid

It is the policy of the Department that First Aid will not take the place of professional treatment.

In the case of minor injuries such as cuts or burns, assistance may be sought from members of the Department who possess a qualification in First Aid.

For serious injuries during normal office hour's emergency medical attention can be obtained from the University Health Services by contacting Ext. 1556.

Updated lists of first aiders in the Department are located near first aid boxes installed throughout the Department. Make sure to familiarise with the location of the nearest first aid box.

Should the local first aiders be unavailable then the emergency services can be contacted on Ext. 1999 or 01-8961999.

2.8 First Aid Boxes

First aid boxes will be maintained by the Chief Technical Officer who will at regular intervals check that the contents of each box are in order and replace missing or outdated items.

The Department will carry a stock of commonly used First Aid materials which will be employed to replace items necessarily used. These will be available from the Chief Technical Officer.

2.9 First aid training

It is the policy of the Department to encourage volunteers from the permanent staff and postgraduate students to attend First Aid courses.

2.10 Reporting Accidents, Incidents and Dangerous Occurrences

All accidents and dangerous occurrences, even those of a minor nature, must be immediately reported to the Department Safety Officer.

In the case of accidents leading to personal injury and/or potentially dangerous occurrences, the Department Safety Officer will provide an official University Accident Reporting Form (Appendix C), which must be completed as soon as possible after the incident.

Details of witnesses to the incident, if any, will also be noted and forwarded, along with the report form, to the College Safety Officer as soon as possible after the incident. A copy of the Accident/Incident form should be filed in the Departmental Accident Record Book held by the Chief Technical Officer.

2.11 Reporting of Hazards

All personnel using Departmental buildings have an individual responsibility to report, directly to the Departmental Safety Officer or Chief Technical Officer, all potential hazards and/or hazardous occurrences, which they may observe.

Undergraduate students who observe hazard/s may report to their class representatives who in turn will report to the Departmental Safety Officer.

2.12 Access to Parsons

The normal working hours for the Department are 8am to 5pm, Monday to Friday. Extended hours for the Department are 5pm to 9pm, Monday to Friday and 10am to 4pm Saturday and Sunday. There will be no access to Parsons Building outside of these hours.

The only circumstances in which those other than staff members, postdoctoral workers, graduate & undergraduate students and accompanied visitors will be permitted to be in the Department outside the normal working hours are as follows:

i. Persons attending evening lectures
ii. Persons attending society meetings
iii. Security Staff
iv. Cleaning Staff
v. Maintenance Staff
vi. Persons with special permission of the Head of Department

Any student carrying out experimental or project work outside normal working hours must have prior permission from their supervisor and from the Department Safety Officer.

2.13 After Hours Working

Working on experimental systems (or machinery) outside normal working hours is not permitted without prior authorization of the project supervisor (or person-in-charge) after he/she has conducted a full assessment of risk and devised a safe system of work.

No staff member, postdoctoral worker or student will be permitted to carry out experimental or technical work of any kind in the Department at any time outside normal working hours unless there is another person close by, who is aware of their presence so that they can summon assistance in the event of an accident.

Isolated individuals must never carry out potentially hazardous work or activities.

The MMBE After Hours/Lone Working Sign In/Out Form must be used when working outside the regular hours of 8am – 6pm, Monday to Friday. Standard operating procedures for working in isolation are outlined in the MMBE Protocol for After Hours Working (Appendix D).

2.14 Hazardous Areas

Areas within the Building, which contain potentially hazardous equipment and/or substances, must be clearly marked with warning signs. Accessing to these areas is prohibited for unauthorised personnel.

Notices describing the hazards present in a laboratory are displayed on the exterior of its door. Before entering a laboratory, it is the duty of each person to acquaint themselves of the hazard/s present and to don the appropriate safety clothing or devices necessary for personal protection.

2.15 Clearways

As far as is practically possible all entrances/exits, corridors, stairways and doorways must be kept clear of obstructions. All temporary obstructions (e.g. during movement of large equipment or maintenance work) should be notified to the Departmental Safety Officer who will designate alternative temporary emergency exit routes.

2.16 Electrical Switch Rooms/Plant Rooms

These rooms must always be kept clear of obstructions. Access to these areas must be kept clear.

2.17 Smoking, Vaping and E-cigarettes

It is University policy to promote and facilitate good health among staff and students of the University. To this end all buildings and vehicles in the ownership or use of the University are 'smoke-free' and smoking is prohibited within such buildings or vehicles, in enclosed entrances, porticos or tunnels and within a distance of 4m from entrance doors, opening windows and entrances to enclosed areas, tunnels or porticos.
Furthermore, the use of E-cigarettes / Vaping is also prohibited within the Department of Mechanical and Manufacturing Engineering.

2.18 Out of hours event management

All out of hours events being organised in the Department are only to be done following completion of an Event Management Plan. Among other things this must consider the following:

- The capacity of the venue
- The numbers expected
- Crowd management
- Fire safety & evacuation of the building
- Names of people in charge/stewards

For out of hours non-MMBE use of Department facilities (lecture theatres, rooms etc.), bookings will only be accepted when accompanied by the appropriate event management plan. Full details along with event plan templates/checklists are available from the University Safety Office under Event Safety.

2.19 Travelling for work

The college provides a business travel insurance scheme with cover only being provided once the journey is authorised via the Head of Department and a travel insurance form has been completed and returned to the estates and facilities department prior to the start of the journey.

This may be done on-line at Estates and Facilities Shared Admin and Support - Insurance (you'll need to have your username & login password registered at TCD Portal- Trinity Web Systems). Alternatively, a hard copy may be printed out and returned to the Estates and Facilities Department, West Chapel, College.

Section 3 – Safety rules for Teaching Labs & Lecture Theatres

The general safety rules and procedures, which apply to all personnel within the buildings of the Department, including staff, students and visitors, are detailed in Section 2 of this document. The following rules apply specifically to personnel (including staff, demonstrators, and undergraduate students) who are authorised to enter and work in the teaching laboratories and lecture theatres of the Department.

3.1 Training

A variety of safety training courses are organised throughout the year by The College Safety Office and the Dept. actively encourages participation. Fire safety training is mandatory for demonstrators and Technical Officers working in undergraduate teaching labs. Additional training may also be mandatory for personnel working in special hazards areas.
Details of scheduled Safety Training courses can be found in the Health & Safety Training section of the University Safety Office website.

3.2 General laboratory rules

- All students must read and abide by the Health and Safety Guidance Manual issued by the Department of Mechanical, Manufacturing and Biomedical Engineering, TCD.
- Smoking, Vaping and the use of E-Cigarettes is not permitted in college buildings.
- Eating and drinking is not permitted in laboratories and lecture theatres.
- Guidance for the use of hazardous equipment, materials and procedures (such as lasers, chemicals or electrical equipment for example) may be found in Section 5 of this document- Designated Safety Areas.
- Coats, bags etc. must not be left on lab benches or anywhere they could cause an obstruction.
- Students are not allowed to work unsupervised without the explicit permission of the lab supervisor.
- Students should not congregate at the entrance to a laboratory or lecture theatre, or at building entrances.
- Students should be made familiar with these rules by the person in charge of the lab or lecture theatre.
- A Risk Assessment must be completed for each process (see Appendices for form)

Section 4 – Safety rules for Offices, Research Labs & Workshops

The general safety rules and procedures, which apply to all personnel within the buildings of the Department, including staff, students and visitors, are detailed in Section 2 of this document. The following rules apply specifically to all personnel (including staff, post-graduate research students, visiting researchers and undergraduate project students) who are authorised to enter and work in research laboratories within the Department.
Additional rules apply for personnel working in MMBE labs within TBSI.

4.1 Responsibility

Overall responsibility for health and safety within the Department rests with the Head of Department. Although at a local level the responsibility for ensuring a safe working environment and safe working practices in individual research laboratories rests with the individual research supervisor, or person in charge of the laboratory, all research workers have a responsibility not to endanger themselves and others by their actions or omissions.

4.2 Specialist safety consultants

In areas where specific identified hazards exist (lasers, chemical, electrical etc.), specialist safety consultants will be designated. These should be consulted prior to undertaking any work in these areas. Designated Safety Areas are outlined in Section 5.

4.3 Authorised access to research laboratories

Access to each individual research laboratory is always strictly limited to those individuals authorised by the appropriate research supervisor or person in charge. In the case of visiting researchers and new staff the research supervisor is responsible for ensuring that the appropriate safety training is provided, if necessary, by specialist safety consultants, before laboratory access is authorised.

Laboratories which contain specific identified hazards (e.g., laser systems, hazardous substances etc.) must be clearly marked with warning signs. Access to such areas is strictly limited to authorised personnel with the appropriate training and expertise. For such areas prior authorisation must be obtained from the research supervisor before visitors or other unauthorised personnel are permitted to either enter the laboratory or undertake any work within the laboratory.

4.4 General Laboratory Practice

- All researchers have a responsibility to maintain a tidy well organised and safe laboratory environment with a safe means of rapid access to and egress from all working areas. Access to all services (water valves, electrical fuse boxes/switches etc.) should always be kept clear.
- All experimental systems should be designed to be fail-safe.
- All researchers should carry out a detailed assessment of the likely hazards and risks associated with their experimental systems and procedures. Research supervisors have a

responsibility for ensuring that such systems and procedures meet the appropriate safety standards. Research supervisors must keep written records of risk assessments carried out (Appendix A) and provide appropriate written work instructions and additional written local safety rules where necessary. The essential steps that are taken in order to complete a risk assessment are as follows:

  - Identify the hazards to health or safety arising from the activity or the workplace.
  - Decide who might be harmed and how.
  - Evaluate the risks and decide whether existing precautions are adequate or more needs to be done.
  - Record your findings.
  - Review your assessment and revise it if necessary.

- A copy of the risk assessment should be lodged with the Departmental Safety Officer. If in any doubt consult the appropriate safety consultant.
- All researchers have a personal responsibility to make correct and full use of all protective clothing, personal protection equipment and safety aids provided in order to minimise risks.
- Researchers must not attempt new procedures or tasks without consulting their supervisor and receiving appropriate safety training.
- All researchers within a laboratory should be kept fully aware of day-to-day modifications carried out on experimental systems or operating procedures and clearly visible warning notices of any resulting potential hazard must be provided.
- Always be vigilant in the need to prevent a fire from occurring in regard to the use of chemicals or electrical equipment (details provided in chemical section). Please make a note of the nearest fire exits so that if a fire breaks out you know how to get out.
- Note the location and method of operation of fire blankets and fire extinguishers. Do not use fire extinguishers unless you have been trained in their use.
- In some research laboratories oxygen monitor alarms are present to indicate if low oxygen levels are present in the laboratory. If the alarm sounds DO NOT ENTER and inform a member of staff immediately. If the alarm is switched off inform a member of staff immediately so it can be re-calibrated for future use.

4.5 Protective Clothing and Personal Protective Equipment

It is the policy of the Department that, where necessary, staff and students should be provided with protective clothing and personal protective equipment. Provision of protective clothing (lab coats, overalls, aprons, gloves) is the responsibility of the research supervisor.

4.6 Unattended experiments/apparatus

Systems should not be left running unattended without consulting with the relevant research supervisor. Where systems operate unattended for any period, an UNATTENDED APPARATUS IV form (Appendix E) must be completed and clearly displayed beside the equipment. This notice must be removed when the condition no longer applies

When carrying out the risk assessment for such systems, special attention should be given to the effects of a loss of services (water, electricity etc.) on the safety of the system.

4.7 Shared Offices

Those who operate co-working spaces have a duty to ensure that, so far as is reasonably practicable, the space and any equipment provided within it is safe. Electrical equipment such as toasters and blow heaters and 3D printers are not permitted in shared offices. Walkways should remain clear of any obstructions at all times.

Section 5 – Safety Designated Safety Areas

In several designated safety areas, for which either procedures are dictated by statutory provisions or where inherent hazards exist due to the nature of such work, explicit safety training is provided for researchers within the School. In these areas, designated safety consultants identify hazards, evaluate risks and provide appropriate specialist safety advice. Specific safety rules and procedures apply in these designated areas. These are detailed below:

5.1 TBSI Safety

Safety Officer for MMBE/TCBE labs and offices in TBSI - Dr. Simon Carroll (Ext. 8503)

All new members of Trinity Centre for Biomedical Engineering (TCBE) should access TCBE SharePoint and review the TCBE Welcome Document (Appendix F) for important information regarding Induction, Health & Safety, Lab Access, SOPs etc. A checklist is available on the SharePoint site that summarizes all the documentation/training that personnel must complete/undertake prior to commencing activities in TCBE labs. Contact *Dr. Simon Carroll* for access to TCBE SharePoint.

5.2 Mechanical Safety

Mechanical Safety consultation - Chief Technical Officer, Mr. Michael Reilly (Ext.1557)

The guarding of dangerous parts of machines & machine tools is a legal requirement (British Standard BS5304 - Safety of Machinery provides a guideline). All the equipment in our Engineering Workshop complies with the standard. However, machine tools are potentially the most hazardous pieces of equipment housed by the Department and great care must be exercised in their use. Local specific safety rules apply to technical staff normally working within the Mechanical Workshop and they have been trained in the use of the full range of workshop equipment. The following rules therefore apply only to research workers and students who enter the Mechanical Workshop.

1. Any person entering the workshop, while machining is in progress, should wear the safety glasses provided.
2. Persons entering the workshop must not directly approach anyone operating machinery but should wait until someone is available for consultation.
3. Only suitably qualified staff are permitted to operate the main workshop machinery.
4. Permission may be given, on an individual basis, for some under & post graduate members to operate a limited range of machinery. This is granted by the Chief Technical Officer if, and only if, he is satisfied that the person in question has adequate experience in the use of the machinery in question.
5. Physical movements within the workshops should be calm and unhurried in nature.
6. Long hair must be 'tied up', jewellery and loose clothing should be secured prior to using workshop equipment.
7. All reasonable commands given by members the Technical Staff should be obeyed.

8. All machines involving dangerous moving mechanical parts must be fitted with the appropriate safety guards/interlocks and should be inspected regularly by appropriately qualified staff.
9. Welding operations of any kind are to be carried out by technical staff only. Appropriate eye protection and gloves must be worn whilst welding. A clearance certificate must be obtained from the College Safety Officer before welding in any location other than the Mechanical workshop.

For those contemplating the use of our workshops further guidance may be found in the HSE book, "***Health and safety in engineering workshops".*** Berkley Library, official publications section. (OPUB GB HEAC 14E:6 or OPUB GB HEAC 14J:1)

5.3 Compressed Gas Safety

Compressed Gas Safety consultation - Chief Technical Officer, Mr. Michael Reilly (Ext.1557)

With compressed gases cylinder pressures may be as high as 300 bar and the gas or gas mixture may be flammable and/or toxic so great care must be exercised in their storage, handling and use. In addition, the use of some gases will also be subject to the Chemical Safety Rules given above.
Flammable or Explosive Gases constitute a hazard within the laboratory environment. Guidance for use of such gases is provided in CP8 - The Safe Storage of Gaseous Hydrogen in Seamless Cylinders & Similar Containers: 1986, produced by the British Compressed Gases Association. Such gases may be used only after appropriate local safety rules and procedures have been established by the research supervisor, in consultation with the College Safety Officer.
Such rules and procedures must be formally recorded and clearly displayed along with appropriate warning notices at all entrances to the designated work area.

The following safety rules apply for all compressed Gases.

1. All users of compressed gases must be fully familiar with the appropriate manufacturer's identification codes and cylinder configurations.
2. Only staff and students who have carried out the Gas Safety Awareness Training Course and have received their certification can connect/disconnect and move gas bottles
3. Never remove or deface cylinder identification.
4. Store cylinders vertically and clamp securely to prevent toppling. Cylinders must not be left free standing at any time.
5. Store in a well-ventilated area away from any fire risk.
6. Valves should be closed and valve outlets plugged or blanked. Valve guards or caps should be securely fitted.
7. Separate cylinders of flammable gases from those of oxygen or oxidants by at least 3m.
8. Cylinders may not be used in a laboratory except by permission of the Dept. Safety Officer. Only those cylinders, which are in current use, may be kept within the laboratory. Do not store cylinders in the laboratory.
9. Where possible pipe gases from a secure location outside the laboratory.

10. Ensure that you have read a current Safety Data Sheet (SDS) for each gas in use in your laboratory and that these are clearly displayed either on or adjacent to the cylinder.
11. A "Compressed gas cylinder in use" form (Appendix V), listing all the compressed gas cylinders currently in use must be displayed outside the entrance to all laboratories containing compressed gases. A compressed gases warning sign (Appendix V) must also be displayed.
12. In rooms where flammable or other hazardous gases are in use, appropriate signage must be displayed on the room entrances.
13. Always use the appropriate trolley to move heavy cylinders.
14. Only suitably equipped and trained personnel may move gas cylinders + fit regulators.
15. Gas cylinders should not be transported in occupied lifts.
16. Use only approved regulators. Check their suitability for the gas in use.
17. It is recommended that regulators are either replaced or refurbished after (at maximum) 5 years from date of purchase.
18. Before connecting the cylinder to your apparatus check the complete system for suitability particularly in terms of pressure rating and materials compatibility. All new pipe work should be inspected, and leak tested by qualified personnel.
19. Never transfer gas from one cylinder to another.
20. Report all faulty cylinder valves and regulators immediately to the Chief Technical Officer.
21. Always close the main cylinder valve when a cylinder is not in use and ensure that an appropriate cylinder key is readily available for rapid shut down of cylinder output.
22. All compressed cylinder gases should be ordered through the Chief Technical Officer's office on foot of a signed requisition from the research supervisor.

The protocol for the use of gas cylinders and the necessary forms can be found in Appendix G of this document.

Empty Cylinders

Empty cylinders are not truly empty. They contain gas at atmospheric pressure. Thus, the cylinder still contains gas at a pressure of at least 1 bar. Depending on cylinder size, this can be a substantial quantity of toxic or flammable substance. It is important to ensure that gas containers are in a safe condition after use.

Before returning empty gas containers, a check should be carried out to ensure that:

- The cylinder valve is closed and not leaking
- The cylinder valve outlet plug or cap nut, if supplied, has been securely refitted. This is particularly important if the contents of the container are toxic

More information can be found in the BOC booklet '***Safe Under Pressure'***.

5.4 Chemical Safety

Chemical safety consultation - Mr. Peter O'Reilly (Ext: 1854)

The Chemicals Safety Act 2008 and 2010 ensures that the use of hazardous chemicals in the workplace is controlled in a safe manner via EU regulations. As a result, the School via its principal investigators and supervisors is responsible for the following:

- Assess the risks that arise from the hazardous substances in the workplace and to identify and provide effective controls to minimize risks and protect people's health
- Ensure that the controls are properly used and maintained in effective working order
- Provide training and information for those who may be affected or exposed
- Monitor exposure and implement health surveillance where necessary
- Provide a list of flammable chemicals used by their research group (approx. quantity and location) to the Department Safety Officer and Chemical Safety Rep. For safety reasons and following University procedures, a sign indicating the presence of flammable chemicals must be available at the door of the laboratory.

Researchers and any other lab users are responsible for observing safe chemical handling and storing protocols.

A copy of the most recent regulations can be found at:
Chemicals Act 2008 (No. 13 of 2008) and Chemicals (Amendment) Act 2010 (No 32 of 2010)

The following rules and procedures apply for all work involving chemical agents within the Department.

1. Hazardous substances may not be ordered (or otherwise procured) before a suitable and sufficient risk assessment has been carried out.
2. Hazardous substances or chemicals may only be procured through the Chief Technical Officer on foot of a signed requisition from the research supervisor.
3. Chemical safety training is provided as necessary. No one may work with hazardous chemicals without having completed an appropriate College safety course or an equivalent.
4. All personnel using a particular chemical should read the manufacturer's Safety Data Sheet (SDS) for that chemical and a copy of the SDS should be retained.
5. A copy of Risk Assessments must be kept by PI and one lodged with the Departmental Safety officer.
6. All work involving chemicals should, as far as is reasonably practical, be carried out in a fume hood making full use of the safety goggles, safety clothing and other safety aids provided.
7. For work requiring use of a fume cupboard, users must at all times adhere strictly to the guidelines for correct fume cupboard usage.
8. Suitable bottle carriers must be used, when transporting Winchester, Quart and Euro-bottle containers of chemical substances, in order to prevent accidental spillages and personal injuries.

9. All stocks of chemicals or hazardous substances used in the Department must be properly stored in suitable chemical storage presses.
10. All chemicals or hazardous substances used in the Department must be clearly labelled including warning signs.
11. All chemical waste must be clearly labelled and disposed of promptly through College's Hazardous Materials Facility (HMF). Containers sent to the HMF should be no more than 2/3 full.
12. Solvent waste should be divided into chlorinated and non-chlorinated waste (and kept apart from acid waste!). Special safety-cans for solvent waste may be obtained from the HMF.
13. All broken glassware and other "Sharps" should be disposed of in the Sharps bins provided. Bins containing contaminated sharps should be labelled and disposed of via the HMF

- Further guidelines are available at Chemical Safety.

5.5 Electrical Safety

Electrical safety consultation – Mr. Diarmuid Geraghty (Ext. 1042)

Due to the variety of electrical appliances within the Department electricity is a major hazard. Research supervisors and persons in charge of research laboratories have a responsibility to ensure that, new, or visiting research, staff have received appropriate training in electrical safety before authorisation of access to research areas and that good general working practices prevail within their research laboratory.

The following electrical safety rules will apply to all mains-powered equipment used in research laboratories:

1. Alteration of or maintenance to any part of a building's electrical services may only be carried out by staff of the College Buildings Office.
2. All new mains-powered electrical equipment must be inspected by suitably qualified personnel prior to installation.
3. Repair and servicing of mains-powered electrical/electronic equipment must be carried out by, or under the supervision of, qualified electrical/electronic technical staff.
4. All electronic circuitry constructed or modified within the laboratory and which will ultimately be either directly mains-powered or electrically coupled to mains-powered units must be tested by qualified technical staff prior to the mains power being switched on.
5. All research supervisors have a responsibility to carry out periodically, detailed assessment of risks associated with electrical equipment under their control and to ensure that all electrical equipment is tested and maintained on an appropriate and regular basis.
6. Hazardous mains-powered equipment undergoing modification or test must not be left powered and unattended without consultation with the responsible member of the technical staff.
7. Areas containing equipment capable of generating high voltages, which may on occasion be exposed, must display warning signs on the entrance doors.

8. Experiments involving electrical equipment, which operate overnight must be designed to be inherently failsafe and capable of safe shut down via the mains isolation switch.
9. The use of rotary transformers without suitable ELCB protection is expressly forbidden
10. Mains cables and plugs should be regularly inspected. Faulty cables are to be replaced immediately.
11. Extension cables and sockets must not be left on the ground. If this cannot be avoided the cable/s must be housed in a 'safety cable cover'.

5.6 Laser Safety

Laser safety consultation – Dr. Tim Persoons (Ext:1936)

All research supervisors and persons in charge have a responsibility to ensure that:

1. All lasers under their control are entered in the University laser register held by the University Laser Safety Officer
2. All new or visiting research staff are registered as designated laser workers and receive the appropriate level of laser safety training before access to laser areas is authorised
3. All relevant safety precautions have been met
4. Appropriate eye protection should be made available to each user
5. Each user must attend the annual Laser Safety training day- For details contact the University Laser Safety Officer, Mr. Christopher Smith Ext. 3649

Postgraduate workers must satisfy their supervisors that that they have taken the safety course and are competent to use laser equipment. Evidence of attendance shall be given to the Departmental Safety Officer. Further information is available at Laser Safety.

5.7 Radiological Safety

Radiological safety consultation – Mr. Peter O'Reilly (Ext: 1854)

Before considering working with ionising radiation, you should firstly ask yourself the following questions:

- Do I need to use ionising radiation to undertake this work? (Are there any safer alternatives that can be used?)
- Can I justify the use of ionising radiation to undertake this work? (Will the benefits arising from the use of ionising radiation in this work outweigh any potential risks?)
- Are the amounts, quantities, concentration and activities of ionising radiation which I intend to use absolutely necessary to enable the proposed work to be undertaken? (Legally the activity of ionising radiation used and the subsequent doses which may result, must be as low as reasonably achievable, this is known as the ALARA principle).
- Can I ensure that the dose rates resulting during the course of my work will not exceed legal limits?

Unless you can answer 'Yes' to each of these 4 questions, you will not be given authorisation to work with ionising radiation, as these are fundamental legal principles which must be complied with.
Working with ionising radiation in the University is on a permit to work basis. Only authorised personnel are entitled to work with ionising radiation. If you intend to work with either radioactive materials (RAM), whether these are sealed or unsealed sources, or with irradiating apparatus, you must first register with the Departmental Radiological Protection Supervisor (DRPS), Mr. Peter O'Reilly.
Further information is available at Radiological Safety.

5.8 Biological safety

Work involving biological samples must comply with the provisions of the SAFETY, HEALTH AND WELFARE AT WORK (BIOLOGICAL AGENTS) REGULATIONS 1994, as amended 1998 and the College biological hazards policy.
Any proposed projects, that may at some stage involve the use of biological samples either within MMBE or by MMBE personnel on projects outside the Department, should be discussed with the College Biological Safety Officer at an early stage. Both a Biohazards Project Registration Form and a Biohazards Personnel Registration Form must be completed and submitted to the College Biohazard Officer. Further information is available at Biological Safety.

5.9 Cryogenic Liquid Safety

The most common cryogenic hazard found in the laboratories is liquid Nitrogen (boiling point -196˚C). Those wishing to use liquid nitrogen must have attended the course 'Safe use of Cryogenics' organised by the safety Office.
The use and handling of cryogenic liquids necessitates the following rules/guidelines:

- Apron, eye protection and thermal gloves when transferring liquids
- A full risk assessment must be used before carrying out any experiment signed via your Principle Investigator
- Ensure adequate ventilation is available in the laboratory of use before carrying out any experiment in-case of inert gas asphyxiation
- In the event of spill or oxygen monitor alarm sounding please evacuate the laboratory immediately and inform a member of staff to assess the situation.
- No-one may travel in lifts with dewars containing liquid nitrogen

For further detailed information please see the University Cryogenic Safety Guidelines

5.10 Visual Display Unit (VDU) Safety Assessment

VDU Safety consultation – Ms. Judith Lee (julee@tcd.ie)

The University VDU Policy guidelines apply mainly to each employee who 'habitually uses display screen equipment as a significant part of his normal work' (e.g. for more than 1 continuous hour per

day, every day) They should be interpreted in a common sense way in the case of occasional and short term users and non-employees.
Under Safety Health and Welfare at Work (General Application) Regulations 2007, all persons working with Visual Display Units (VDUs or Computer Monitors), should have their workstation assessed to ensure that any potential hazards related to poor ergonomics, unsatisfactory seating, poor lighting or glare etc. can be identified and rectified at an early stage.
Note: Laptops are not covered under these regulations. Where laptops are used, they should have docking stations where the keyboard is detachable. If by the owner's choice they wish to use a laptop they must sign off on its use.

5.11 Dignity and Respect Policy

The Department of Mechanical, Manufacturing and Biomedical Engineering is committed to creating an environment where every employee and student is treated with dignity and respect. The University promotes, and is committed to supporting, a collegiate environment for its staff, students and other community members, which is free from discrimination, bullying, sexual harassment, excess stress and other forms of harassment. If you feel affected by any of these issues please contact your class representative, research supervisor or line manager directly. For more detailed information, standard procedures and contact details please see the University Dignity and Respect Policy

5.12 General Information

Should you have any queries/updates on this Health and Safety Policy please contact the Department Safety Officer Mr. Gordon O'Brien to make any changes/recommendations.

For the University Health and Safety guidelines/advice please visit The University Safety Office

For current up to date Health and Safety Guidelines please see The National Health and Safety Authority

5.13 Storage of training records/risk assessments

All risk assessment forms and standard operational procedures should be available in the labs for consultation by staff and students, reviewed annually and stored with the School Safety Officer for reference and review. All training records for Academic, Technical, administrative and research staff and students should be updated at least annually and stored with the school administrator for review via head of department.

Section 6 – Important Contacts

Title/Function		Present Holder	Email	Phone
Emergency		**University Security**		**1999**
First Aid Personnel		Mr. Michael Reilly	mireilly@tcd.ie	1557
		Mr. Alex Kearns	kearnsal@tcd.ie	1463
Head of Department		Prof. Ciaran Simms	csimms@tcd.ie	
Department Safety Officer		Mr. Gordon O'Brien	Gordon.obrien@tcd.ie	2396
Chief Technical Officer		Mr. Michael Reilly	mireilly@tcd.ie	1557
TCBE Safety Officer		Dr. Simon Carroll	Scarrol6@tcd.ie	8503
MMBE Specialist Safety Areas				
VDU Safety		Ms. Judith Lee	julee@tcd.ie	
Laser Safety		Dr. Tim Persoons	Tim.persoons@tcd.ie	1936
Chemical Safety		Mr. Peter O'Reilly	poreilly@tcd.ie	1854
Radiation Safety				
Bio Hazards Safety				
Electrical Safety		Mr. Dermot Geraghty	Dermot.geraghty@tcd.ie	1042
Compressed Gas Safety		Mr. Michael Reilly	mireilly@tcd.ie	1557
Mechanical Safety				
Thermo Lab Safety		Mr. Gerry Byrne	gerbyrne@tcd.ie	3523
STAM Labs Safety		Dr. Garret O'Donnell	odonnege@tcd.ie	1184
Design Loft Safety		Dr. Conor McGuinn	mcginnco@tcd.ie	3767
Fire Wardens	Parsons Building	Ms. Judith Lee	julee@tcd.ie	
		Mr. Peter O'Reilly	poreilly@tcd.ie	1854
		Mr. Gerry Byrne	gerbyrne@tcd.ie	3523
		Mr. Alex Kearns	kearnsal@tcd.ie	1463
		Mr. Gordon O'Brien	gordon.obrien@tcd.ie	2396
	WATTS	Dr. Mark Culleton	Waiting on training	
	TBSI		TBA	
University Safety Officers			University Safety Office	
Head of Safety		Dr. Katherine Murray	Katherine.murray@tcd.ie	1914
Biological Hazards		Dr. Mary McDonnell	mmcdonn8@tcd.ie	3965
Radiation Protection		Dr. Gillian Gunning	gillian.gunning@tcd.ie	2877
Fire Safety		Mr. Cathal Ryan	SafetyOffice@tcd.ie	4000
Additional University Contacts				
Head of Security		Mr. Michael Murray	Michael.murray@tcd.ie	2648
University Health Service			College Health	1591 1556

Acknowledgement Forms

Online MS Forms versions of the Acknowledgement Forms are preferred. A restricted access spreadsheet will be held by the Department. Only the Head of Department, Department Safety Officer and Chief Technical Officer will have access to this information.

A. MMBE STUDENT ACKNOWLEDGEMENT FORM
B. MMBE STAFF ACKNOWLEDGEMENT FORM
C. TCBE MEMBER ACKNOWLEDGEMENT FORM

Appendix

The Appendix files for this document are located on the MMBE Safety Section of the Website under Safety-related Forms and Links.

A. RISK ASSESSMENTS
B. MMBE IDENTIFIED HAZARDS
C. INCIDENT/ACCIDENT REPORT
D. MMBE LONE AND OUT-OF-HOURS WORKING POLICY
E. UNATTENDED APPARATUS FORM
F. TCBE WELCOME DOCUMENT
G. COMPRESSED GAS SAFETY AN FORMS