

Analytical Lab Cottrell Room 4B140

This space is used for undergraduate honours project work, postgraduate and departmental research.

All lab users must act responsibly and safely while working in the sports laboratories.

Health and Safety information

Emergency Procedure: there is an emergency procedure notice on the wall next to the telephone. Please familiarise yourself with this procedure and your location within Cottrell building.

Induction: A laboratory induction is required prior to commencing any work in the laboratory. Contact the laboratory manager to arrange an induction before you want to start.

Defibrillator: The automatic defibrillator is situated on the wall in the annex to room 3B142C.

Fire: There are two fire extinguishers located in 4B corridor along from the lab for use in the event of a fire. If the fire alarm sounds, all lab users must leave the laboratory, leaving all bags and belongings behind. Exit the laboratory and then exit the building via the nearest stairwell.

Out of hours and lone working: University policy (refer to safety handbook on guidance on safety in research located on the Occupational Risk & Environmental sustainability Home Page). See links at <https://sportsciencesafety.stir.ac.uk>.

First Aid box: Is located on the wall by the door entrance.

First Aiders: A list of current first aiders are on the wall next to the door.

Reporting accidents and incidents: Minor injuries are reported to a departmental First Aider or the Safety Officer and incidents logged using WorkRite. In case of emergencies follow the emergency control procedure to arrange for an emergency service response.

Risk assessments, Standard operating procedures, Safety data sheets and Manufacturer's manuals: are held on the Health and Safety Information web pages and next to the relevant equipment. <https://sportsciencesafety.stir.ac.uk/>

Laboratory Rules

Note: Wash your hands before commencing any lab work and before leaving the laboratory

- You must attend a laboratory induction before you start any work
- Wear personal protective equipment as required – lab coat, gloves and safety glasses
- Clean workstation bench with 70% ethanol before commencing lab work. Spillages should be contained with absorbent towels and the area cleaned
- Food, drink and mobile phones when wearing gloves are not permitted in this laboratory. Timers and calculators are available in the lab
- Minimum labelling requirements include contents description, owner initials and date
- Risk Assessments (RAs) need to be completed prior to commencing any work. Standard operating procedures (SOPs) are available. Your work may require additional SOPs
- Manufacturer’s manuals are available in the Safety folder and adjacent to equipment
- Waste disposal is separated into normal (black bin liners, tips to be bagged) and clinical waste (yellow bag, sharps bin). Inform a member of staff when bins are full. Clinical waste is taken to BES stores for specialist uplift and disposal
- Fridge and freezers – always fully label containers and request long term storage space
- Lab books should be used to keep experimental records and note any protocol changes
- If stocks of any consumable items become low or if there are any issues with equipment, spillages or breakages please inform a member of staff
- Correct use of equipment should be demonstrated by lab staff prior to use

<ul style="list-style-type: none">• Thermocycler• Bead beater• Centrifuges• Fume hood• Ultrapure water system• Ultrasonic cleaner• ILab chemistry analyser• Microplate washer• Balances• pH meter• Heat block• Tube rotator• Magnetic stirrer		<ul style="list-style-type: none">• Nanodrop spectrophotometer• Pipettes• Autoclave• Qubit reader• Plate shaker• Orbital shaker• Haematocrit centrifuge• Ice maker• Plate reader• Flame photometer• Automated liquid dispenser• Fridge and freezer
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Risk assessment / Control Procedure

Faculty	Health Sciences and Sport		
Head of Faculty	Professor Jayne Donaldson		
Safety Officer	Nidia Rodriguez-Sanchez		
Completed by	Dr Kerry Bartie		
Change log	Version 1.1	26 Jan 2022	Added change log
	Version 1.2	17 Apr 2023	08 June 2023 -Laboratory Rules: Listed equipment -Changed hazard category order: Listed non F6 & F6 -F6 under chemical hazard: Added acid & alkali section -COSHH section: Updated safety data sheets
	Version 1.3	08/06/2023	Removed Covid 19 specific content
	Version 1.4	11/08/2023	Added Amended Waste Regulations
	Date Reviewed	08/06/2023	Next review due

The activity

Activity	Research analysis
Equipment used	See hazards
Categories of people involved	Staff, UG, PG, Visitors
Location of activity	Analytical Laboratory
Duration of activity	Continual
Frequency of activity	Continual
Legal compliance to standards and regulations required	<p>Health and Safety at Work act 1974 (HASAWA) https://www.hse.gov.uk/legislation/hswa.htm</p> <p>Management of Health and Safety at Work Regulations 1999 (MHSWR) https://www.legislation.gov.uk/uksi/1999/3242/contents/made</p> <p>Provision of Work Equipment Regulations 1998 (PUWER) https://www.hse.gov.uk/work-equipment-machinery/puwer.htm</p> <p>The Control of Substances Hazardous to Health Regulations 2004 (COSHH) https://www.hse.gov.uk/coshh/</p> <p>Special Waste Amendment (Scotland) Regulations 2004 SSI 112 https://www.legislation.gov.uk/ssi/2004/112/contents/made</p>

Hazard categories

Ethical approval requires hazards to be ascribed to a category. Use the following categories when describing the hazards in the table on the next page. Mark each category that applies clearly below.

F1. Working in a dangerous area: e.g. high crime area, area of civil/political unrest, psychiatric unit or prison. Check with the Foreign and Commonwealth Office Travel Website and with University Insurance Officer prior to travel overseas. Discuss risk assessment/control measures with the management of any institution involved or with local police/law enforcement.	Yes No
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<ul style="list-style-type: none"> - Take into account the possibility of psychological injury (trauma/PTSD and stress) as well as physical injury. - Give contact details and measures to be taken in case of emergency. 	
<p>F2. Working in an isolated geographical area: An isolated geographical area can include city parks, urban brownfield site as well as a remote hillside or a valley.</p> <ul style="list-style-type: none"> - Take into account physical isolation through distance, screening effect of shrubbery/woodland or lack of mobile phone signal, etc. rather than just distance from “civilisation”. - Give contact details and measures in case of emergency. 	<p style="text-align: center;">Yes</p> <p style="text-align: center;">No</p>
<p>F3. Lone working: Lone working can include unaccompanied visits to research subjects in their own home, etc., as well as working alone in the field. Working alone in an office environment with access to a phone is not usually categorised as “lone working”.</p> <ul style="list-style-type: none"> - Give contact details and measures in case of emergency 	<p style="text-align: center;">Yes</p> <p style="text-align: center;">No</p>
<p>F4. Working with equipment: Please detail the risks associated with this</p> <ul style="list-style-type: none"> - Give the manufacturer and model -Take into account how the equipment and users are affected by the location 	<p style="text-align: center;">Yes</p> <p style="text-align: center;">No</p>
<p>F5. Environmental hazards: e.g. extremes of weather (temperature, wind speed, ice, etc.), rough terrain, animals, plants, earthquake, water quality, contaminated land, derelict/unstable buildings are examples of factors to be considered here.</p>	<p style="text-align: center;">Yes</p> <p style="text-align: center;">No</p>
<p>F6. Chemical & biological hazards: e.g. laboratory and other chemicals and mixtures (eg, oils, acids, chemical wastes (pre-existing or generated during the project), detergents, crop spraying or fumigation, diseases (of humans, animals or plants).</p> <ul style="list-style-type: none"> - If this section is applicable, a full COSHH risk assessment will always be required. 	<p style="text-align: center;">Yes</p> <p style="text-align: center;">No</p>
<p>F8. Emotional risks: e.g. sensitive research. This can include many areas that can be emotional triggers – research with or regarding children, animals, conflict (war, terrorism, holocaust studies, etc.), and natural disasters are examples.</p> <ul style="list-style-type: none"> - The predisposition of the individuals should always be taken into account as an individual’s emotional triggers depend very much upon that individual’s personal/family history. 	<p style="text-align: center;">Yes</p> <p style="text-align: center;">No</p>

The Hazards

*Details under relevant heading in appendix

All hazards other than category F.6 (Chemical and biological hazards) should go here

Faculty / Service Area:			FHSS, PENRG		Location:		Cottrell Room 4B140		
Description of work task / equipment /area being assessed:									
Postgraduate and departmental research analysis									
What are the hazards?	Hazard category	Who might be harmed and how?	What are you already doing to control the risks?	*Risk rating	What additional controls (if any) are required to reduce the risks?	*Risk rating	Action by who?	Action by when?	Date of completion
Failure to use lab equipment safely Flame Photometer Propane gas cylinder	F4 Working with equipment	Lab users <ul style="list-style-type: none"> Gas poisoning, asphyxiation Explosion 	<ul style="list-style-type: none"> Instruction, SOP Gas regulator inspection PPE gloves and goggles		Monthly inspection Personal O ₂ monitor for use while the unit is in operation Only competent staff in good health are allowed to handle gas bottles Instruction on use: in well ventilated area, safe valve removal		Competent person	Continual	

What are the hazards?	Hazard category	Who might be harmed and how?	What are you already doing to control the risks?	*Risk rating	What additional controls (if any) are required to reduce the risks?	*Risk rating	Action by who?	Action by when?	Date of completion
Autoclave	F4 Working with equipment	Lab users/operator <ul style="list-style-type: none"> Explosion – pressurised vessel/liquids Steam/heat-burn 	<ul style="list-style-type: none"> Instruction, SOP SOP 		User log sheet. Quarterly inspection and instrument sterilisation validation		Competent person	Continual	
Centrifuge	F4 Working with equipment	Lab users/operator <ul style="list-style-type: none"> Liquid items not balanced correctly Contamination of internal compartment and lid if a spillage/leak occurs Individual users Lab bench area 	Instruction, SOP Always use insert lids when centrifuging liquids in tubes Protective PPE <ul style="list-style-type: none"> Lab coat, gloves and apron for clinical applications involving body fluid analysis 		User log sheet Yearly inspection and maintenance service		Competent person		
Fume hood	F4 Working with	Operator/Lab users <ul style="list-style-type: none"> Asphyxiation due to toxic vapours 	Instruction, SOP Ensure fan is in operation		User log sheet Yearly inspection and maintenance		Competent person		

	equipment	<ul style="list-style-type: none"> Corrosive burns/spillage of harmful solvents 	<p>before opening the fume hood hatch.</p> <p>Always work with hatch at the recommended height safety level</p> <p>Clean fume hood area thoroughly after use</p>		service (Estates & Campus services)				
Lone working	F3	<p>Investigators and participants</p> <p>a. Increased exposure to hazards due to lack of assistance from co-workers</p> <p>b. Stress and fatigue lead to poor health and function</p> <p>c. Increased risk of harm associated with isolation in case of an incident</p>	<p>See University policy</p> <p>Conduct individual risk assessment</p> <p>Laboratory users instructed not to work alone or out of hours unless necessary</p> <p>a. Laboratory users instructed to take extra care and be aware that they are at a greater risk. Also not to perform hazardous activities.</p>	4	Working with phenol is not permitted out of hours	3	Supervisor		

			<p>b. Lone workers in regular contact with their supervisors or line managers who monitor stress and wellbeing.</p> <p>c. Lone workers instructed to inform other available and competent staff of their schedule, location and contact information. For longer periods of work or more hazardous activities, periodic check – ins are required. Emergency procedures, first aid kit and telephone available in each room</p> <p>Instruction given in SOPs and induction</p>						
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COSHH Section

Anything in category F.6 (Chemical and biological hazards) should go here

*Details under relevant heading in appendix

Manufacturers COSHH data sheets are required for all chemical hazards

The Substance What are the hazards and *classification? *Route of exposure	*WEL mg/m3	Who might be harmed and how?	What are you already doing to control the risks?	*Risk rating	What additional controls (if any) are required to reduce the risks?	*Risk rating	Action by who?	Action by when?	Date of completion	Health monitoring
Daily weekly solution preparations: Decon 90 Detergent 5% working solution Irritant Skin Eyes		Lab users Skin irritation Eye irritation	Provide eye goggles, washing up gloves Instruction on PPE during induction and in SOP. Employee should wear a laboratory coat and gloves during handling Spillages should be contained	2						No

			<p>with absorbent material e.g. paper towelling, and rinsed with water</p> <p>Instruction – In case of contact with eyes rinse immediately with plenty of water for least 5 minutes</p> <p>In case of contact with skin, wash affected area thoroughly with water</p>							
<p>Absolute Ethanol 70% Ethanol working solution</p> <p>Isopropanol</p> <p>Flammable</p>		<p>Individual lab users</p> <p>Skin irritation</p> <p>Eye irritation</p>	<p>Store ethanol and isopropanol stock bottles (2.5 L) in designated flammables cabinet</p> <p>Provide eye protection,</p>	2						No

<p>Irritant Skin Eyes</p>			<p>washing up gloves, lab coat</p> <p>Instruction on PPE during induction and in SOP</p> <p>Spillages should be contained with absorbent material e.g. paper towelling</p> <p>Instruction – In case of contact with eyes rinse immediately with plenty of clean, flowing water and seek immediate medical attention</p> <p>In case of contact with</p>							
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			skin, rinse immediately with plenty of clean, flowing water. Seek medical attention if there is persistent irritation							
Milton Sterilising Solution 10% working solution Irritant Skin Eyes		Individual lab users Skin irritation Eye irritation	Provide eye goggles, Marigold rubber gloves Instruction on PPE during induction and in SOP. A lab coat and gloves should be worn at all times Spillages should be contained with absorbent material e.g. paper towelling and the area rinsed with	2	Eye wash station					No

			<p>water</p> <p>Instruction – In case of contact with eyes rinse immediately with plenty of water for least 5 minutes</p> <p>In case of contact with skin, wash affected area thoroughly with water</p>							
<p>Concentrated acids and alkalis</p> <p>Corrosive</p>		<p>Lab users</p> <p>Corrosive</p>	<p>Segregation. Concentrated acids to be stored in designated acid cabinet separate from alkalis. Acetic acid is combustible and can be stored in the flammables cabinet</p>	3						

			<p>Instruction on PPE during induction and in SOP</p> <p>Wear lab coat, gloves and eye protection. If acid is fuming use fume hood as toxic if inhaled</p> <p>When diluting always add acid or alkalis to water. Be aware of heat generation and chemical incompatibility</p> <p>Diluted acids or alkalis can be handled on the bench with appropriate protective equipment and hazard labelling on the container</p>							
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Chemical reagents Refer to relevant RA/SOP and individual SDS sheets		Individual lab users	Instruction on PPE during induction and in SOP. There is a separate waste disposal route for hazardous chemicals e.g. chlorinated solvent waste	3						No
Body fluid sampling		Investigators and participants Biological hazard	RA08 Weekly inspection of housekeeping	2						No
Clinical waste disposal Biological hazard Needlestick		Lab users Biological hazard	RA09 Weekly inspection of housekeeping	2						No

Append supplier safety data sheets for all substances here:



SDS_Decon75.pdf



SDS_Ethanol.pdf



SDS_Milton.pdf



isopropanolSDS.pdf

Appendix

Risk ratings

Risk ratings are a way of evaluating risk. A risk is defined as the likelihood that a hazard will cause harm combined with the severity of the harm. We can apply a value to a risk by using the following formula and matrix.

$$\text{Risk} = \text{Likelihood} \times \text{Severity}$$

Likelihood	Severity				
	Trivial	Minor Injury	Over 3 Day Injury	Major Injury	Incapacity or Death
Highly Unlikely	1	2	3	4	5
Unlikely	2	4	6	8	10
Possible	3	6	9	12	15
Probable	4	8	12	16	20
Certain	5	10	15	20	25

Risks can then be prioritised by their rating

- 1 Urgent Action - (Risk 15 - 25)
- 2 High Priority - (Risk 10 - 12)
- 3 Medium Priority - (Risk 5 - 9)
- 4 Low Priority - (Risk 2 - 4)
- 5 Very Low Priority - No Action Required (Risk 1)

This gives the leads to the residual risk: Low (Risk 1-4), Medium (Risk 5-9), or High (Risk 10 to 25). If the risks are acceptable (Low Risk) then you may feel able to proceed without further action. If the risk is Medium or High then you must do something to bring the risk to a "tolerable" level.

Control measures

Control measures are actions that reduce the risk to a tolerable level. Controls should be chosen to reduce the severity and or likelihood of a risk. Controls should be applied in an order of preference or Hierarchy of Controls:

- Elimination – Remove the hazard
- Substitution – Exchange the risk for something less likely or severe
- Physical Controls – separation or isolation, prevent contact with the hazard
- Administrative controls - safe operating procedures to ensure safe interaction with hazard
- Information, instruction, training & supervision – warn people of the hazard and tell or show them how or help them to deal with it.
- Personal Protective Equipment – dress people to reduce severity of harm

COSSH section

The Control of Substances Hazardous to Health Regulations 2002 require additional specific risk assessment for hazardous substances. Fill in the COSHH section for any of the substances identified under hazard category F.6 .

Control is adequate when the risk of harm is 'as low as is reasonably practicable'. This means you need to demonstrate that:

- All control measures are in good working order.
- Exposure is below the Workplace Exposure Limit, where one exists.
- Exposure to substances that cause cancer, asthma or genetic damage is reduced to as low a level as possible.

"A brief guide to COSHH": <https://www.hse.gov.uk/pubns/indg136.htm>

Workplace exposure limits (WEL)

There is a maximum exposure to hazardous substances defined by law. These workplace exposure limits are given in the following document.

"EH40/2005 Workplace exposure limits": <https://www.hse.gov.uk/pubns/priced/eh40.pdf>

COSHH Hazard classifications

This information should be given on the exterior of the container and on the COSHH data sheet supplied with the hazardous substance.

- Very Toxic
- Toxic
- Corrosive
- Harmful
- Irritant
- Sensitiser
- Dust
- Teratogenic
- Carcinogen or suspected carcinogen
- Microorganism
- Possible long-term effects

COSHH Routes of exposure

Routes of exposure are the different ways hazardous substances interact with the body. There may be more than one route.

- Contact damage to skin or eyes
- Injection
- Absorption through skin
- Ingestion
- Inhalation

Safe operating procedures

The faculty provides safe operating procedures for many activities these can be found on the health and safety web pages and in the folders located near any equipment they apply to. The activity you are planning may require an additional procedure to be written as a control. Contact the safety officer for help with this as they may be able to identify similar activities the procedure should apply to. They will also be able to advise on a suitable format and wording.

Pre operation equipment checks

Pre operation checks are detailed in operating procedures found on the health and safety web pages and in the folders located near any equipment they apply to. Fill in the form provided each time you use the machine. Report any issues you encounter in your check and leave a note on the machine. Do not be tempted to skip pre operation checks. Faulty machinery can cause injury.

Resources, instruction, information, supervision and training

In addition to the resources mentioned elsewhere. Manufacturer user manuals are available from the health and safety webpages <https://sportsciencesafety.stir.ac.uk> and in the folders by the equipment. Training and supervision are arranged as part of the laboratory induction. Remember, you must not work in any laboratory without obtaining authorisation for the activities you wish to undertake as part of an induction. Inductions should be repeated on a regular basis as indicated on your induction record. If further instruction, training or supervision is required, please contact the person in charge of the laboratory.

Records, reporting faults

Every time you use a piece of equipment you should fill in the use form in the folder located nearby and note any faults you experience. This is important as adequate maintenance requires monitoring and maintenance periods are determined by the amount of use.

Where does this all come from?

As part of your University induction and regular training you should have taken a set of compulsory courses <https://www.stir.ac.uk/about/professional-services/estates-and-campus-services/safety-environment-and-continuity/safety/induction-courses/>

The University has further information available on their health and safety pages <https://www.stir.ac.uk/about/professional-services/estates-and-campus-services/safety-environment-and-continuity/safety/>

The Sport Science health and safety pages are here <https://sportsciencesafety.stir.ac.uk>

Employers, employees and people who own buildings have a legal duty to their own safety and the safety of any others who may be affected by their activities. This mainly comes from the Health and Safety at Work act 1974 (HASAWA) and the Management of Health and Safety at Work Regulations 1999 (MHSWR). Substances used in the workplace must be used in accordance with The Control of Substances Hazardous to Health Regulations 2004 (COSHH). Work equipment must be suitable, safe and well maintained in accordance with The Provision of Work Equipment Regulations (PUWER). Further regulations apply to machinery. Machinery is a special category of work equipment which usually incorporates a motor. The legal requirements are summarised in guidance provided by the Health and Safety Executive. The guidance is much easier to read and can be found on the HSE web site.