

## Risk Assessment

<b>Task/Activity</b>	<p style="text-align: center;"><u>General ECS Teaching Lab Risk Assessment</u></p> <p style="text-align: center;">Access to and working in the following list of ECS teaching or project labs: <u>B16.1003, 1007, 1009, 1011, B59 LEVEL 2</u></p>		<b>Date</b>	24/07/20
<b>Unit/Faculty/Directorate</b>	FEPS / ECS	<b>Assessors</b>	Jeff Hooker Tony Wood	
<b>Line Manager/Supervisor</b>	David Oakley	<b>Primary site/location</b>	B16, B59	
<b>Brief details/comments</b>	<p>This Risk Assessment forms part of ECS Labs Induction Process.</p> <p>The hazards and risks highlighted in the assessment are generic to the lab areas and has been produced so anyone (staff/students/contractors/visitors) who require access to work or visit any of the above listed labs (or associated Technicians Areas) will be briefed and required to sign the assessment to gain access and to formally acknowledge the safety policies and procedures in force.</p> <p><u>Additional notes:</u></p> <p>Specific Risk Assessment for working on or using certain equipment are issued separately (i.e. HV, 3-Phase, Tensiometer, 3D printer, laser cutter)</p>			



Version 200-116/2021

PART A										
(1) Risk identification			(2) Risk assessment				(3) Risk management			
Hazard	Potential Consequences	Who might be harmed  (user; those nearby; those in the vicinity; members of the public)	Inherent			Control measures (use the risk hierarchy)	Residual			Further controls (use the risk hierarchy )
			Likelihood	Impact	Score		Likelihood	Impact	Score	
2) Exposure to High Voltage, current or temperatures	Possible electric shock injury (Death)	Main user and anyone in the immediate vicinity of the equipment	5	5	25	No exposed voltages greater than 30V DC or 30Vrms AC. Any mains equipment is not to be used without a valid electrical test label/certificate. The mains supply must not be tampered with. The electrical 230V ring main has RCD in the circuit. Projects incorporating potentially high voltage/current must provide safeguards to limit exposure and possibly limit the voltages/currents/power accordingly.  It is the responsibility of student and project supervisor to provide additional data regarding risks & controls for individual or group projects.  SEE ALSO – NEW EQUIPMENT SEE ALSO – Component overheating / explosion	5	1	5	

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3) Exposure to potentially hazardous waste chemicals/sharps	<p>Minor and major sharps injuries including lacerations and puncture type injuries.</p> <p><u>Possible causes</u></p> <p>Poor or no training. Incorrect or no storage and disposal arrangements. Lack of awareness for disposal of sharps.</p>	Main user and anyone in the immediate vicinity	4	4	16	<p>All hazardous waste is to be disposed of in the appropriate manner. Waste or chemicals with expired dates are to be weighed and then placed into a plastic bag, with details of what the chemical is and contact name. Then contact the Laboratory Manager who will then contact the relevant person to get the chemicals disposed of. All sharps are to be only placed in the yellow waste bins, not in the general waste bins. Any potential toxic waste is to be placed into a sealed bag/box, with the relevant information on the bag/box such as, name of chemical, the potential hazard, the amount/weight, the data and the contact details of the user. The laboratory manager will then arrange for the waste to be collected and then disposed of via the university hazardous/toxic waste policy</p>	3	2	6	<p><u>NB Scoring</u></p> <p>See: (Inherent – Chemical)</p> <p>(Residual – Sharps)</p>

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4) Exposure to fumes from chemicals	Minor (non-life changing) and major (life changing) chemical injury. Long or short-term illness. Death.	Main user and anyone in the immediate vicinity	4	4	16	When using chemical that are either irritant or can cause issues with the respiratory system, the exposure must be kept down to a low level. If there are any concerns with the use of a chemical or solution, please see the laboratory manager or School Safety Officer. Students & project supervisors are responsible for providing COSHH & MSDS data along with advised risk controls. Useful resource: <a href="http://www.hse.gov.uk/coshh/essentials/">http://www.hse.gov.uk/coshh/essentials/</a>	4	1	4	
5) Security of the Laboratory	Unauthorised persons within the lab, potential safety and security issues	Main user and anyone in the immediate vicinity	5	4	20	Only authorised users are allowed to use the facilities in the laboratory. Non-authorised users are allowed to enter the laboratory, but they must be with an authorised member of staff at all times. Authorised users must not hand over their cards to non-authorised users. The door also must not be left open or not unlocked for long periods of time. Do not allow 'tail-gating'. This is also to stop unauthorised persons from entering the laboratory which might result in equipment being removed/damaged.	5	1	5	<u>NB Scoring</u>  See: Lone working plus visitors and events for scoring level

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6) Injuries: Fire, burns and smoke inhalation	Injury or loss of life.  Total loss of building or laboratory.  <u>Possible Causes</u>  Flammable chemicals and gases, heat sources e.g. lasers, hot plates, Electrical failure.	Main user and anyone in the immediate vicinity	3	5	15	All exit routes (normal and emergency) must be kept clear at all times, and not used for storage. Smoke detectors, alarm call points, fire extinguishers, etc must not be obstructed or interfered with. Such items are routinely maintained and tested by Estates & Facilities. Fire doors must be kept closed and not obstructed. Minimise storage of combustible materials overall. Ensure all cardboard and paper is immediately disposed of into the correct bins.  Avoid use of hot plates if at all possible, otherwise they must not be left on when unattended and must be switched off and unplugged when not in use. They must be kept away from combustible materials and must not be covered. Hot plates to carry a sign 'HOT' when in use or cooling down.  Evacuate as soon as alarm sounds. Cooperate with fire marshals and fire drills	4	2	8	

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7) Injuries: Falls (on same level);  Sliding on a slippery floor surface or tripping over an obstruction or damaged flooring;	Significant injury such as a broken wrist, twisted knee, wrenched back etc	Main user and anyone in the immediate vicinity	4	3	12	Immediately clean up any spillages, even small spills, and ask colleagues to do likewise. Display a yellow warning sign if a slip or trip hazard remains. Ensure no obstruction such as papers, files, boxes, wires, rucksacks are left on the floor and that trailing cables are eliminated or made secure. Report damaged flooring lab manager / School Safety Officer for urgent attention. Mark problem area clearly with tape so area is not a trip hazard.  Report any faults to lab manager / School Safety Officer immediately.	4	2	8	

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8) Injuries: Falling objects;  Files, books, boxes, etc falling from shelves, shelves detaching from walls, filing cabinets falling over, etc;	Injuries such as cuts contusions and crushing	Main user and anyone in the immediate vicinity	3	4	12	Do not overload shelves. Get loose or doubtful shelving repaired. Do not use before repair has been completed. No heavy or large items to be stored above shoulder height, including storage on top of cupboards. Make sure any object is tested for weight before lifting.  Filing cabinets must have a functioning mechanism to prevent more than one drawer being opened at a time. Do not leave drawers open. Fill filing cabinets from the bottom drawer upwards. Supply kick stools when necessary	3	3	9	
9) Injuries: Work at height;  Fall from a height (less than 1 m in an office environment);	Significant injury such as a broken limb, wrenched back, severe contusion, etc.	Main user and anyone in the immediate vicinity	4	4	16	Do not stand on chairs, desks, tables, etc. If you need to reach up, obtain a suitable kick stool or stepladder. Make sure the step ladder is suitably positioned. Do not lean on a step ladder or kick stool. Stepladders must have regular recorded safety checks. Sensible footwear is needed for such tasks	4	1	4	



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10) Emergencies: Lone Working	All hazards, out of hours testing and research	Main user of the equipment	5	4	20	By arrangement with the School Safety Officer, a separate risk assessment has to be carried out with regard to working outside the normal working hours of 08:00 to 23:00 (including separate university closure periods/dates normally communicated by the School Safety Officer) Any user must be aware and have asked permission to work outside of these dates/hours, and the instruction laid out in the lone working risk assessment must be followed.	5	1	5	Prohibited without RA authorisation and controls established on a case by case basis

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11) Injuries: Musculoskeletal / DSE;  Incorrect working posture and/or incorrect workstation setup and/or poor work habits / pattern;	Debilitating and painful musculoskeletal injury such as tendonitis in the wrists, tennis elbow, carpal tunnel syndrome, chronic shoulder, neck or back pain	Main user of the equipment	3	4	12	Successful completion (staff and PGRs only) of the online by DSE training and assessment package (contact your Faculty/Service Health & Safety Officer) to be completed by all new staff members. Any issues identified as a result to be resolved by local Faculty/Service DSE assessors and any significant musculoskeletal problems are to be referred to Occupational Health.  Correct working posture and workstation setup (as per the online package) should be adopted, and regular breaks to be taken (at least 5 mins every hour).  Avoid clutter on, under and around work desks – apply ‘good housekeeping’	3	3	9	

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12) Injuries: NEW EQUIPMENT related	Possible electric shock injury (Death)	Main user and anyone in the immediate vicinity of the equipment	5	5	25	Any new pieces of equipment/process or equipment/process being bought into the laboratory must have, permission from the Laboratory Manager and also a brief work plan. This is to show the laboratory manager that the equipment/process is safe to be used in this laboratory and this also shows the laboratory manager that the person wanting to use or bring in the equipment/process has thought about the dangers/hazards and what pre cautions are required and what is in place. Brought-in mains powered equipment must undergo a PAT safety test c/o qualified departmental technician SEE LATER SECTION 16: Safety check of electrical devices in the laboratory (PAT testing)	5	1	5	

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13) Debris, Food & Drink in proximity with equipment	<u>Working with Lead</u>  Lead poisoning: Lead interferes with a variety of body processes and is toxic to many organs	Main user and anyone in the immediate vicinity	4	3	12	<p>The laboratory is to be kept in a clean and safe state at all times, Laboratory 1005 has benches &amp; areas where work can be carried out but once completed, the work area must be cleaned, and the area left clear and ready for the next user.</p> <p>Absolutely no opened food or drink allowed in the Lab.</p> <p>Not only is this a good general workplace practice, this is also to minimise any potential dangers regarding safety. This is the responsibility of everyone who uses the laboratory: if an untidy area has been discovered without proper labelling or identification of user or hazards, the laboratory manager is to be informed ASAP</p> <p>Use the appropriate bins provided in the lab</p>	4	2	8	

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14) Injuries: Soldering & rework in room 1005	Possible injuries: burns and to the eyes	Main user and anyone in the immediate vicinity of the equipment	5	5	25	There are specific rework areas designated in the laboratory (or soldering irons can be issued). Training to use the lab soldering irons can be provided by the Lab manager upon request. Irons in use must be guarded and safety glasses are to be worn at all times when undertaking soldering. Soldering equipment must be switched off when job is finished.	4	1	4	
15) Injuries: Component overheating / explosion	Explosion, burns Injuries from flying debris	Main user and anyone in the immediate vicinity	5	3	15	Use current limit on bench power supplies. Predict and plan for heat dissipation of components. Ensure components connected with correct polarity (eg pin 1 on semiconductors, polarity on electrolytic capacitors). Ensure electrical ratings are compiled with (e.g. capacitor voltage rating).	5	1	5	

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16) Injury due to faulty mains powered equipment: Safety check of electrical devices in the laboratory (PAT testing)	Possible electric shock injury (Death)	Main user and anyone in the immediate vicinity of the equipment	5	5	25	All equipment bought into the laboratory must be safety tested (PAT tested to ensure that the plug and electrical components are in a safe working order. NOTE: The university has a policy where any new equipment must be PAT tested before use - the instrument is then re-tested either every 6 months or every year, and an 'up to date' sticker is placed on the instrument indicating that the instrument has passed or failed. If any equipment is found in the laboratory that either hasn't been PAT tested/PASSED or the label on the instrument is out of date, please immediately contact the laboratory manager, and do not use the instrument until the PAT testing has been carried out. Damaged equipment must not be used and must be reported to the lab manager.	5	1	5	Fixed covers, regular electrical safety testing, training

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17) Sudden illness Welfare/hygiene	Major and minor injuries to persons in the lab. Lack of awareness for site. Medical emergency.	Main user and anyone in the immediate vicinity	3	3	9	All normal toilet facilities to be available to all. Conditions in toilets to be monitored and issues raised with Estates and Facilities via School Safety Officer. Do not drink the water from the toilets in B16 Signs of illness warranting concern for physical wellbeing amongst colleagues (e.g. fits, collapsing, fainting): inform lab manager / School Safety Officer or other member of staff	1	2	2	<u>NB Scoring</u>  See: placements for sudden illness scoring
18) Injuries: Flying debris	Injuries from flying debris	Main user and anyone in the immediate vicinity	5	5	25	Ensure clippings/strippings captured. Use eye protection as necessary (essential for soldering).	4	1	4	
19) Injuries: cuts and abrasions	Hand and Eye injuries Drilling cutting sawing etc	Main user and anyone in the immediate vicinity	4	3	12	Correct use of hand tools including use of correct tool for task. Use of scalpel/blades: eye protection (mandatory) & hand protection (discretionary) must be used. NOTE: Lab manager available for advice	3	3	9	

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20) Battery Charging	<p>Burns, cause fires or explode.</p> <p><u>Possible Causes</u></p> <p>Hazardous, especially if damaged, over charging, exposed to fire or short circuited.</p>	Main user and anyone in the immediate vicinity of the equipment	3	5	15	<p>Specific risks with charging all batteries with either off-the-shelf chargers or your own charging circuit designs are fire and explosion related.</p> <p>Ensure that batteries are charging within fireproof bags supplied by ECS technicians. Ensure that charging batteries are not left unattended. Ensure that physically damaged or even batteries known to have been misconnected or overcharged are disposed of on the appropriate metal container present in labs.</p> <p>Ensure that battery terminals cannot be accidentally shorted. Ensure that battery terminals use polarised connectors. Add short-circuit protection into circuits where appropriate. Always follow the manufacturers' recommendations regarding the charging rate, temperatures and cut-off criteria (as per datasheet).</p> <p>Be aware of nearest CO2 fire extinguisher.</p>	2	5	10	



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21) Drone operation	Serious injury, damage to property from contact with flying drone.	Main user and anyone in the immediate vicinity of the equipment	4	4	16	<p>Specific risks associated with the indoor flying operation of drones: risk of crashing into person(s) and building fittings and fixture through driver error or malfunction.</p> <p>ALL flying (including testing) will take place within a designated enclosed flying zone. This zone will be unpopulated when any testing/flying is undertaken. The zone will be a fully enclosed environment.</p> <p>ALL testing and flying within the designated zone will have an observer present in addition to the pilot.</p> <p>All drones will be equipped with propeller guards. The propeller guards will protect person(s), building, and drone from the risk of harm from the drone's rotors. The guards will minimise this from happening accidentally.</p> <p>Signs will be placed in prominent view to display and advise that drones will be flown in the designated zone.</p>	1	4	4	<p>Policy, guidance, risk assessment.</p> <p>The drone is light-weighted (~1.2kg). restricted access to test area.</p>

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**PART B - Approval**

**Declaration by responsible manager:** I confirm that this is a suitable & sufficient risk assessment for the activities identified above and that all residual risks can be reduced to as low as is reasonably practicable.

Signed		Print name		Date	
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**PART C – Action Plan****Risk Assessment Action Plan**

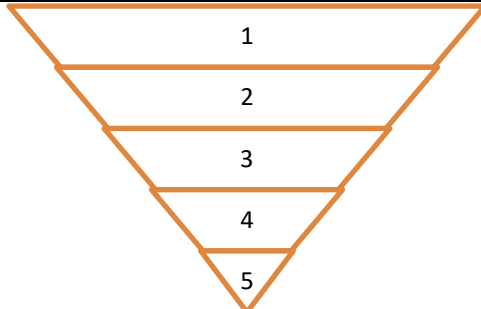
Part no.	Action to be taken, incl. Cost	By whom	Target date	Review date	Outcome at review date
Responsible manager's signature:				Responsible manager's signature:	
Print name:			Date:	Print name:	
				Date	

**PART D - Acknowledgement**

**Declaration by users:** I confirm that I have read this risk assessment, understand the controls outlined herein and will report to the responsible manager any incidents that occur or any shortcomings I find in this assessment.

<b>Signed</b>		<b>Print name</b>		<b>Job Title/Student</b> (UG/ <u>PGT</u> /PGR/PHD)		<b>Date</b>	
Signed		Print name		Job Title/Student (UG/PGT/PGR/PHD)		Date	
Signed		Print name		Job Title/Student (UG/PGT/PGR/PHD)		Date	
Signed		Print name		Job Title/Student (UG/PGT/PGR/PHD)		Date	
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Signed		Print name		Job Title/Student (UG/PGT/PGR/PHD)		Date	

## Assessment Guidance

1. Eliminate	Remove the hazard wherever possible which negates the need for further controls	If this is not possible then explain why	
2. Substitute	Replace the hazard with one less hazardous	If not possible then explain why	
3. Physical controls	Examples: enclosure, fume cupboard, glove box	Likely to still require admin controls as well	
4. Admin controls	Examples: training, supervision, signage		
5. Personal protection	Examples: respirators, safety specs, gloves	Last resort as it only protects the individual	

LIKELIHOOD	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
	1	2	3	4	5	
	IMPACT					

### Risk process

1. Identify the impact and likelihood using the tables above.
2. Identify the risk rating by multiplying the Impact by the likelihood using the coloured matrix.
3. If the risk is amber or red – identify control measures to reduce the risk to as low as is reasonably practicable.
4. If the residual risk is green, additional controls are not necessary.
5. If the residual risk is amber the activity can continue but you must identify and implement further controls to reduce the risk to as low as reasonably practicable.
6. If the residual risk is red do not continue with the activity until additional controls have been implemented and the risk is reduced.
7. Control measures should follow the risk hierarchy, where appropriate as per the pyramid above.
8. The cost of implementing control measures can be taken into account but should be proportional to the risk i.e. a control to reduce low risk may not need to be carried out if the cost is high but a control to manage high risk means that even at high cost the control would be necessary.

Impact		Health & Safety
1	Trivial - insignificant	Very minor injuries e.g. slight bruising
2	Minor	Injuries or illness e.g. small cut or abrasion which require basic first aid treatment even in self-administered.
3	Moderate	Injuries or illness e.g. strain or sprain requiring first aid or medical support.
4	Major	Injuries or illness e.g. broken bone requiring medical support >24 hours and time off work >4 weeks.
5	Severe - extremely significant	Fatality or multiple serious injuries or illness requiring hospital admission or significant time off work.

Likelihood	
1	Rare e.g. 1 in 100,000 chance or higher
2	Unlikely e.g. 1 in 10,000 chance or higher
3	Possible e.g. 1 in 1,000 chance or higher
4	Likely e.g. 1 in 100 chance or higher
5	Very Likely e.g. 1 in 10 chance or higher