Activity	Student Robotics Tech Day	**Location**	37 Hills Rd, Cambridge CB2 1NT, United Kingdom		**Likelihood**	**Likelihood rating**	**Severity**	**Severity rat**	**Risk rating**	**Category**	**Tolerability**	**Comments**					
			Start	**End**	Very unlikely	1	First Aid injury/illness	1	1-2	Very low	Acceptable	No further action is necessary other than to ensure that the controls are maintained.					
Assessors	Andy Barrett-Sprot	**Event dates**	25/11/24	25/11/24	Unlikely	2	Minor injury/illness	2	3-4	Low	Acceptable	No additional controls are required unless they can be implemented at very low cost (in terms of time, money and effort).					
Date assessed	04/12/2024				Likely	3	'3 day' injury/illness	3	5-7	Medium	Tolerable	Consideration should be given as to whether the risks can be lowered, where applicable, to a tolerable level, and preferably acceptable level, but the costs of additional risk reduction measures should be taken into account. The risk reduction measures should be implemented within a defined time period.					
					Fairly likely	4	Major injury/illness	4	8-14	High	Tolerable	Substantial efforts should be made to reduce the risk. Risk reduction measures should be implemented urgently within a defined time period and it might be necessary to consider suspending or restricting the activity, or to apply interim risk control measures, until this has been completed. Considerable resources might have to be allocated to additional control measures.					
					Very likely	5	Fatality/disabling injury	5	15+	Very high	Unacceptabl	Substantial improvements in risk control are necessary, so that risk is reduced to a tolerable or acceptable level.					

Who is at risk	**Description**
Competitors	A competitor (16-19 year old) who is involved in the risk activity
Team Supervisors	A named Team Supervisor (responsible adult) for the team who is involved in the risk activity
Volunteers	Someone working on behalf of Student Robotics who is involved in the risk activity
Third Parties	Someone not involved in the risk activity. This may include competitors, team supervisors, volunteers, or event visitors.

Hazard	**Description**	**Who is at risk**	**Likelihood**	**Severity**	**Risk Factor**	**Controls**	**Likelihood**	**Severity**	**Risk factor**	**Responsible person**
Injury while using manual or power tools	Inappropriate use of tools resulting in tools slipping and/or breaking and thereby injuring the user or those nearby.	Competitors Team Supervisors Third Parties	4	3	12	Tools should only be used when appropriate. Team Supervisors to supervise all tool use by teams. All use by Volunteers should be by a competent adult. Loose hair or clothing to be tucked in or removed whilst operating tools. Student Robotics will not provide any tools to Competitors. Basic safety gear will be provided. Tools to be visually inspected before every use. Work pieces should be properly secured/supported. First aid provision available to manage any incidents.	2	3	6	Team Supervisors Event Coordinator
Soldering	Inappropiate use of soldering irons could lead to burns	Competitors Team Supervisors Third Parties	5	4	20	All soldering irons to be treated as if they are hot even if they are unplugged (since they may still be cooling down). Saftey glasses are to be worn when soldering	1	4	4	SR Health and Safety Coordinator
Interaction with robots: electric shock	Robots operate from battery power, and outputs can be enabled/disabled autonomously use of higher voltage batteries or circuitry could pose a risk	Competitiors Team Supervisors Volunteers	1	3	3	All voltages within robots to be within SELV limits (120VDC, 50VAC maximum). Additional power sources used on the robot must be approved beforehand and must provide an easy and safe cutoff mechanism, obvious and accessible from the top of the robot. Robots subject to a safety inspection randomly throughout the event. Teams will be required to rectify any potentially dangerous areas of their robots. The battery must connect only into the Student Robotics Power Board which is capable of cutting the power off from the rest of the robot.	1	1	1	Team Supervisors Event Coordinator
Interactions with robots: burns	Parts of the robot heat up due to electrical energy dissipation or friction. This might result in a minor burn on the skin.	Competitors Team Supervisors Volunteers	2	2	4	All Student Robotics circuit boards are housed in a protective casing. Team Supervisors to supervise work on robots. Robots must be powered down if left unsupervised. Volunteers should inspect a robot to identify any potential risks before handling. Power outputs from the Student Robotics kit are limited.	1	2	2	Team Supervisors Event Coordinator
Injury to Competitors, SR Volunteers, and Visitors due to unsafe robots	Robots may behave in unsafe ways, either inherently or due to performing something typically safe but in inappropriate circumstances. Examples include a sharp edge being exposed, or a projectile being launched towards observers.	Competitors Team Supervisors Volunteers Third parties	3	2	6	Team Supervisors to supervise work on robots. Robots inspected randomly throughout the event, access to batteries can be revoked at any time. Robots must be powered down if left unsupervised. Robots to be immobilised being handled. Anyone identifying a potential safety issue to report it to a Blueshirt. A readily available and obvious power off button connected to the Student Robotics Power Board must be accessible from the top of the robot. The battery must connect only into the Student Robotics Power Board which is capable of cutting the power off from the rest of the robot. Volunteers should inspect a robot to identify any potential risks before handling.	1	2	2	Event Coordinator
Electric shock from mains sources	Unsuitable use of mains equipment, or the use of damaged mains equipment or cabling, results in a high voltage high current electric shock	Competitors Team Supervisors Volunteers Third parties	2	4	8	Mains equipment and cabling to be appropriately rated and fused. All powered equipment to be used when appropriate and in the manner they are designed to be used. Mains cabling to be inspected at intervals for damage. All Student Robotics mains equipment used to be visually inspected before use. Damaged equipment to be retired from use.	1	4	4	Team Supervisors Event Coordinator

Injury from improper manual handling	Improper handling technique, or moving of equipment with insufficient people results in the individual handling causing personal injury. Handling of equipment unsafe for manual handling resulting in cuts or other physical injury. Nearby third parties getting injured by moving equipment, or crushed by dropped equipment.	Competitors Team Supervisors Volunteers Third parties	3	3	9	Team Supervisors to supervise their teams. Volunteers involved in manual handling trained and briefed. Manual handling only performed within an individual's ability. Handling to be broken down into managable chunks where possible and appropriate. An appropriate number of indivduals to be involved in any manual handling. Trolleys and elevators used where possible When moving robots elevators to be preferred or extreme care taken on stairs Heavy equipment not to be moved in busy areas unless unavoidable. Robots not to exceed 16kg.	2	3	6	Team Supervisors Event Coordinator
Slips, trips, and falls	Obstructions or liquids on the floor resulting in a person falling, potentially whilst carrying equipment. This can potentially result in bruises or broken bones.	Competitors Team Supervisors Volunteers	4	4	16	Extension leads secured down and inspected regularly. Cabling and equipment kept off the floor in regular and high use walkways. Team Supervisors to enforce teams keeping their areas tidy. Running is not permitted. Any identified slip or trip hazards to be signed and removed as soon as possible. Obsticles on walkways (i.e. arena entrances) to be clearly marked.	2	3	6	Team Supervisors Event Coordinator
LiPo Batteries	The lithium polymer (LiPo) batteries used within the robots have the potential if mistreated to ignite and become a self-sustaining fire. Smoke released from this combustion is potentially harmful if inhaled.	Competitors Team Supervisors Volunteers Third parties	1	5	5	All batteries to be charged in fire-proof bags Damaged equipment (e.g. exposed wires) to be retired from use. Robots to provide isolated enclosure for installed batteries to protect against crushing or puncturing damage. Competitors and Team Supervisors have been informed about safe use of the batteries throughout the competition year. SR Volunteers and Team Supervisors to identify batteries showing signs of damage or swelling remove from circulation for safe disposal. Boxes containg batteries clearly labelled	1	3	3	Team Supervisors Event Coordinator
Safeguarding Incident	Competitors are under the age of 18 and volunteers or adults attached to teams may fall into the category of vulnerable adults	Competitors Vulnerable Adults	2	4	8	Safeguarding Lead to appoint a Safeguarding Officer who is responsible for handling incidents at the event. All Volunteers to have read and understood the SR safeguarding policy. Responsible adult to be present and responsible for competitors throughout the event. If a young/vulnerable person arrives without a Team Supervisor, it is ensured that there are at least two Volunteers supervising the student while their responsible adult is located. If the responsble adult isn't going to turn up, the situation is to be dealt with on a case by case basis. Refusing entry to a young/vulnerable person could lead them stranded in an unknown location.	1	4	4	Safeguarding Officer Volunteers
Fire	Injuries caused by fire within the venue	Competitors Team Supervisors Volunteers Third parties	1	5	5	Organisers will be familiar with fire alarm and evacuation arrangements for venues. Volunteers to be made aware of arrangements and how to act in an emergency.	1	5	5	Event Coordinator Volunteers
Inability to access toilets / reenter building	The building has many access doors restricted to ID cards only, especially the route to the restrooms.	Competitors Team Supervisors Volunteers Third parties	4	2	8	A volunteer will be posted in sight of the exit door and will open the door to gain access to the restrooms. The volunteer will then watch the doors for the person to get back in to the main room.	1	2	2	Event Coordinator Volunteers
Car park	Pedestrians hit by cars in car park	Competitors Team Supervisors Volunteers Third Parties	2	3	6	Participants to be encouraged not to hang around in car park, clear signage visible from car park instructing on how to enter building safely	1	3	3	Team Supervisors Event Coordinator