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| **Risk Assessment** | | | | |
| **Risk Assessment for the activity of** | **Southampton Robotics Outreach**  **10th – 13th April 2025**  **Building 42** | | **Date** | **02/11/2024** |
| **Group name** | **Southampton Robotics Outreach & Student Robotics** | **Assessor** | **William Barber** | |
| **Supervisor** | **Alex Colville** | **Signed off** | **SUSU Activities Team** | |

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| ***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** | | |  | **Residual** | | | **Further controls (use the risk hierarchy)** |
| **Likelihood** | **Impact** | **Score** | **Control measures (use the risk hierarchy)** | **Likelihood** | **Impact** | **Score** |  |
| Injury while using manual or power tools | Tools slipping/breaking, thereby injuring the user or those nearby. | Competitors, team supervisors and 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. * Safety Glasses to be worn in the power tools area * Teams reminded in advance that they should provide their own safety gear along with 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** |  |
| Soldering | Burns | Competitors, team supervisors and 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** |  |
| Interaction with robots | Electric shock | Competitors, team supervisors, volunteer | **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 at the beginning of the competition and randomly throughout the event. * Teams will be required to rectify any potentially dangerous areas of their robots, and may be prevented from competing until they do so. * 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** |  |
| Interaction with robots | Minor burns on skin due to energy dissipation or friction. | Competitors, team supervisors, volunteers, third parties | **3** | **2** | **6** | * Team Supervisors to supervise work on robots. * Robots subject to a safety inspection before use. * Robots re-inspected randomly throughout the event, entry into the arena or access to batteries can be revoked at any time. * Robots must be powered down and placed within the team pits if left unsupervised. * Robots to be be immobilised being handled. * Anyone identifying a potential safety issue to report it to the safety inspector. * Arena access controlled by SR Volunteers, maximum of 4 teams at a time, and modification of robots inside the arena is not permitted (this also applies to the test arena). * 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. * During matches, Competitors are not allowed in the arena whilst the robots are in motion. | **1** | **2** | **2** |  |
| Unsafe robots | Minor injury due to robots behaving in unsafe ways, either inherently or due to performing something typically safe but in in inappropriate circumstances. | Competitors, team supervisors, volunteer and third parties | **3** | **2** | **6** | * Team Supervisors to supervise work on robots. * Robots subject to a safety inspection before use. * Robots re-inspected randomly throughout the event, entry into the arena or access to batteries can be revoked at any time. * Robots must be powered down and placed within the team pits if left unsupervised. * Robots to be be immobilised being handled. * Anyone identifying a potential safety issue to report it to the safety inspector. * Arena access controlled by SR Volunteers, maximum of 4 teams at a time, and modification of robots inside the arena is not permitted (this also applies to the test arena). * 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. * During matches, Competitors are not allowed in the arena whilst the robots are in motion. | **1** | **2** | **2** |  |
| Unsuitable use of mains equipment or the use of damaged mains equipment/cabling | High voltage high, current electric shock | Competitors, team supervisors, volunteer and 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** |  |
| 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, volunteer, 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** |  |
| 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, volunteer | **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 pit areas tidy. * Carrying of robots or large or heavy objects on the stairs to be kept to a minimum. * Running is not permitted. * Any identified slip or trip hazards to be signed and removed as soon as possible. * Obstacles on walkways (i.e. arena entrances) to be clearly marked. | **2** | **3** | **6** |  |
| 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, volunteer, third parties | **1** | **5** | **5** | * All batteries to be charged in fire-proof bags and by trained volunteers. * 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 and deliver to Helpdesk for safe disposal. * Batteries not to be given to teams until teams are safety checked * Boxes containing batteries clearly labelled | **1** | **3** | **3** |  |
| Injury moving robots into/out of the arena | Robots have to be lifted into and out of the arena, involving lifting a potentially large and heavy robot over the arena wall and over and around arena components which may present trip hazards.  Time limitations require robots to be powered up at time of arena entry, potentially allowing unexpected robot movement. | Competitors and volunteer | **3** | **3** | **9** | * Individuals carrying robots reminded not to rush, support provided or the carrying prevented if insufficient time is available. * Student Robotics volunteers to intervene if handling is deemed unsafe. | **1** | **3** | **3** |  |
| Injury due to objects falling from height | A person on the ground is injured by a person or object falling from a height | Competitors, team supervisors, volunteer, third parties | **3** | **5** | **15** | * Areas in which work at height is being performed to be restricted. * Physical barriers to be used where objects are at risk of being pushed over the edge of barriers or ledges. * Leaning over or holding objects over ledges at heights not permitted. * Objects are not to be passed up or down from heights where an alternative route is available. | **1** | **5** | **5** |  |
| Hearing damage from excessive noise levels | Exposure to sounds at too great a volume for an extended period causing damage to the listeners hearing | Third parties | **2** | **3** | **6** | * Avoid use of excessive volumes, this is managed by the venue technicians. | **1** | **3** | **3** |  |
| Reaction to theatrical effects utilised, such as lighting effects | Theatrical effects causing shock, or epileptic (or similar) fits. | Third parties | **2** | **3** | **6** | * Signage to be clearly visible in areas where theatrical effects are used. * Flashing lights and smoke to be kept to a minimum. * Clear announcement of theatrical effects to be made immediately before testing in areas where theatrical effects are used. | **1** | **3** | **3** |  |
| Accidents due to fatigue from working long hours | Fatigue induce poor judgement resulting in unknown task-specific accident causing injury to the individual undertaking the task or those nearby. | Competitors, team supervisors, volunteer, third parties | **3** | **3** | **9** | * Team Supervisors to supervise their teams. * Volunteers suspected of excessive tiredness to be sent home to rest. * Volunteers encouraged to take breaks. Opportunity and space for volunteer breaks available. * Working extended hours to be discouraged. | **1** | **3** | **3** |  |
| 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 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** |  |
| Getting Lost | Attendees unfamiliar with the campus may get lost | Competitors, team supervisors, volunteers, third parties | **3** | **2** | **6** | * Clear directions given to attendees to get them to initial venue. * Familiarisation of building provided by Volunteers upon entering new buildings pointing out toilets and where majority of people will be. * Signage around venues to let attendees know where is off limits and directions to toilets etc. | **1** | **2** | **2** |  |
| Fire | Fire within the venue | Competitors, team supervisors, volunteer, third parties | **3** | **5** | **15** | * 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** |  |

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| ***PART B – Action Plan*** | | | | | | | |
| **Risk Assessment Action Plan** | | | | | | | |
| **Part no.** | **Action to be taken, incl. Cost** | **By whom** | **Target date** | | **Review date** | **Outcome at review date** | |
| 1 | Acquire first aid cover | Student Robotics | 1st April 2025 | | 5th April 2025 |  | |
| 2 | Provide training to volunteers | Student Robotics | 11th April 2025 | | 12th April 2025 |  | |
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| Responsible committee member signature:  A.Colville | | | | | Responsible committee member signature:  M.Merlas | | |
| Print name:  Alexander Colville | | | | Date:  3/1/25 | Print name:  Mihai Stefan Merlas | | Date:  3/1/25 |

**Assessment Guidance**

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| * Eliminate | | | | | Remove the hazard wherever possible which negates the need for further controls | | | | If this is not possible then explain why |  |
| * Substitute | | | | | Replace the hazard with one less hazardous | | | | If not possible then explain why |
| * Physical controls | | | | | Examples: enclosure, fume cupboard, glove box | | | | Likely to still require admin controls as well |
| * Admin controls | | | | | Examples: training, supervision, signage | | | |  |
| * 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** | | | | | |

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| 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. |

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| 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 |