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| **Risk Assessment** | | | | |
| **Risk Assessment for the activity of** | **Group Design Project – 3D Printing Farm** | | **Date** | **18/10/2024** |
| **Unit/Faculty/Directorate** | **Faculty of Engineering and Physical Sciences** | **Assessor** | **John Walker** | |
| **Line Manager/Supervisor** | **Ara Khodavirdi** | **Signed off** |  | |

| ***PART A*** | | | | | | | | | | |
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| **(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** |
| Poor posture | Poor sitting posture with incorrect support can damage spinal structures and contribute to back pain | User | **3** | **3** | **9** | Always ensure chair and back support is adjusted to provide the best comfort. | **1** | **1** | **1** |  |
| Electrical shock | Short-circuit to frame from mains would deliver a shock before socket shutter activates if user touches printer. | User | **2** | **4** | **8** | Ensure that printer plug is UK type or that machine has been inspected for electrical safety. | **1** | **2** | **2** |  |
| Burn | Touching printer hot end during printing operations would inflict temporary burns on skin and other materials, | User | **2** | **2** | **4** | Never touch the printer hot end or hot bed during printing operations or if the displayed nozzle temperature is too hot or unknown. | **1** | **2** | **2** |  |
| Tool injury | Incorrect use of a tool may result in the slipping and loss of control of the tool which could result in the injury of the user or others. | User and bystanders | **2** | **3** | **6** | Sterile work conditions during the operation of tools. | **1** | **3** | **3** |  |
| Lower body trauma | Dropping the 3D Printers could inflict injuries on lower body (especially feed and knees) due to the weight of the machines, | User | **1** | **3** | **3** | Lifting plan, sterile work conditions during machine lift and use of hard-closed shoes within the workshop. | **1** | **1** | **1** |  |
| Toxic fume liberation | If printers are loaded and set to print with ABS then air in workshop can become toxic | User and bystanders | **1** | **3** | **3** | Never print with ABS or other toxic filaments. | **1** | **1** | **1** |  |
| Post-processing abrasion | If during post-processing of 3D prints sanding paper is used to smooth print surfaces an abrasion can happen | User | **2** | **2** | **4** | Sterile work conditions during print post-processing | **1** | **2** | **2** |  |
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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** | |
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| Responsible manager’s signature: | | | | | Responsible manager’s signature: | | |
| Print name: | | | | Date: | Print name: | | Date |

**Assessment Guidance**

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

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| **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. |

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.

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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 |