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| UTS SAFE WORK METHOD statement (SWMS) |

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| 1. **FACULTY/SUBJECT** | |
| Faculty/Subject title | 41013 Industrial Robotics |
| Subject supervisor/coordinator | Gavin Paul |
| SWMS prepared by | Paul Morian |

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| 1. **WORK ACTIVITY DESCRIPTION** | | | | | | |
| Describe the work activity E.g. Operating, Handling, Using.. Include names of hazardous equipment, substances or materials used,  and any quantities and concentrations of substance(s) or reaction products. | Baker’s Assistants cobots will work together to assist in the baking and storing of loaves of bread.  One of the robots present will open an oven and remove a tray of bread from inside of the oven and place it on the kitchen bench. The other robot will pick up the bread from the oven tray and move it to a secondary storage/packaging location ready for usage.  **The 2 robots used will be the UR3 and the LBR iiwa.** | | | | | |
| 1. HAZARDS: Choose those hazard types that will need to have control measures in Section 4 | | | | | | |
| **Work Environment**   * Working in Remote Locations * Working Outdoors/fieldwork * Clinical/Industrial setting * Poor ventilation/Air quality * Temperature extremes * Working at Height * Slip/Trip/Fall hazards | | **Plant**   * Noise * Vibration * Working with compressed air * Lifts Hoists or Cranes * Moving parts (Crushing,friction, cut, stab, shear hazards) * Pressure Vessels or Boilers | | **Chemical**   * Hazardous Chemicals use * Skin/eye irritant * Sensitiser * Mutagen * Carcinogen * Toxic to reproduction * Aquatic toxicity * Toxic * Corrosive * Dangerous when wet | | **Ergonomic/Manual Handling**   * Repetitive or awkward movements * Lifting heavy objects * Over reaching * Working above shoulder or below knee height * Poor workstation set up |
| **Electrical**   * Plug in equipment * High voltage * Exposed wiring * Exposed conductors | | **Radiation**   * Ionising Radiation * Non-ionising radiation (Lasers, Microwaves, Ultraviolet light) | | **Biological**   * Sharps/Needles * Cytotoxins * Pathogens/infectious materials * Infectious materials * Communicable diseases * Animal/insects * Work with fungi/bact/viruses | | **Psychosocial**   * Aggressive or violent clients/students * Working in isolation * Working with timeframes * Staffing issues |
| 1. **CONTROLS MEASURES: Choose those that apply for hazards identified** | | | | | | |
| **Eliminate/Isolate/Substitute / Engineering Controls**   * Remove hazard * Restrict access * Redesign equipment * Guarding / Barriers / Fume Cupboard / exhaust * Biosafety cabinet * Use safer materials/substances * Ventilation * Regular maintenance of equipment * Redesign of workspace / workflow | | | **Admin specific: Licenses/permits Work Methods**   * Training Information or Instruction * Licensing or certification of operators * Test and tag electrical equipment * Restricted access * Regular breaks * Task rotation * Work in pairs * Document Chemical risk assessment * Ladder / Sling register | | **Emergency Response Systems**   * First aid kit * Chemical spill kit * Safety shower * Eye wash station * Emergency Stop button * Remote Communication Mechanism | |
| **Other controls not listed** | | | | | | |
| 1. **PPE REQUIRED (Tick those that apply)** | | | | | | |
| http://www.orr.uts.edu.au/images/pictograms/protection/hand.pnghttp://www.orr.uts.edu.au/images/pictograms/protection/face.pnghttp://www.orr.uts.edu.au/images/pictograms/protection/eye.pnghttp://www.orr.uts.edu.au/images/pictograms/protection/hearing.pnghttp://www.orr.uts.edu.au/images/pictograms/protection/foot.pnghttp://www.orr.uts.edu.au/images/pictograms/protection/ppe.png | | | | | | |
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| 1. **EMERGENCY EQUIPMENT** | | | | | | |
| http://www.orr.uts.edu.au/images/pictograms/equipment/eyewash.pnghttp://www.orr.uts.edu.au/images/pictograms/equipment/spill.pnghttp://www.orr.uts.edu.au/images/pictograms/equipment/shower.png | | | | | | |
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| 1. **work activity steps** |
| **before you start:**  The robots will be attached to a typical kitchen benchtop that might be seen in a bakery or similar facility. Before powering on the surrounding area will be checked, and colleagues will be notified of the robotics usage. Electrical connections will be checked, and code will be properly and entirely simulated to ensure no errors will be present. The contents of the oven will be verified to be ready for collection and the robot will be ready to begin its sequence.  **steps in work activity:**  The cobots will be powered on when the bread in the oven is near completion. Both robots' function will be tested through manual function. Code will be loaded onto the robot and run once bread is near completion.  Robot 1 will begin at the readiness of the bread in the oven, once ready to be collected a baker can commence the cobots. Robot 1 will open an oven and pick up a tray that is inside of it, at this point the robot will remove this tray and place it on the kitchen bench beside itself. From here, Robot 2 will pick and place each individual loaf of bread to a secondary location, for either storage or packaging. The robots will not be left unattended and will be monitored until the completion of the sequence. Robots will then be powered off when finished.  **emergency procedures:**   * Press emergency e-stop button * Robots will stop if collisions detected * Notify security or dial 6 using the UTS internal phone   **training required:**   * Robotic systems training |

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| 1. **sign off** | | |
| **prepared by:**  **NAME: Paul Morian** | **Lab Supervisor**  **Name: Michael Lee** | **Date: 05/09/22**  **Review Date: 05/09/22** |