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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 | James Gunner, Finn Witney, George Karpouzos |

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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. | Upload MATLAB code via ROS for UR3e robot and 7dof robot mimicking our chosen IIWA robot to demonstrate our simulation. A robotic system that is designed to function as a sandwich assembly line, through use of a UR3e robot with a gripper on linear rails, and a IIWA robot with a knife/blade attached to the end effector. The IIWA blade will be used to butter bread and cut the sandwich whilst the UR3e with be a pick and place function to construct and move the product. This will occur within a kitchen/cafe setting on top of a table. There will be a group of three students as that is how many are in our group; one will be operating their code and another ready to press estop if necessary whilst the third films and makes sure that no one enters the workspace. The simulation of this activity will take place in the mechatronics lab or in B02.06.150, whilst the real-life model is set to be conducted in a kitchen/cafe setting. | | | | | |
| 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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| http://www.orr.uts.edu.au/images/pictograms/protection/respiratory.pnghttp://www.orr.uts.edu.au/images/pictograms/protection/head.pnghttp://www.orr.uts.edu.au/images/pictograms/protection/hair.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:**   * Safety inductions * Load specifications * Run simulations of the operations * Ensure all equipment and materials are present and have been serviced * Prepare to stand within reaching distance of the estop during operation * Ensure a clear surrounding.   **steps in work activity:**   1. Ensure proper PPE is equipped before proceeding 2. Before approaching the system ensure the LED light is indicating the system is turned off and deactivated, and the estop is engaged 3. Ensure the workspace is clean/hygienic and prepared 4. Check for any leaking fluids, food debris, dirt and/or growths on all the food equipment 5. Communicate the starting procedure to surrounding persons 6. Turn on the GUI software for the system 7. Stand in a position near the estop button 8. Ensuring all persons have exited the work zone, disengage the estop and turn on the system 9. Before beginning operations, ensure each robot is working without error, and the gripper end effector is functional 10. During operation remain within reach of the emergency stop. 11. After the system is no longer in use, shut down the system through the GUI, and engage the estop 12. Clean all debris and seal all food containers in the workspace. 13. Inspect all components of the system that are directly in contact of food, that they are clean and sanitary 14. Inspect the quality and condition of the blade, and clean 15. After cleaning up, close the software and leave ready for the next operator   **emergency procedures:**   * Press emergency button * CALL 000   **training required:**   * Lab induction * Safety Induction * WH&S sign off |

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| 1. **sign off** | | |
| **prepared by:**  **NAME: James Gunner, Finn Witney, George Karpouzos** | **Lab Supervisor**  **Name: Michael Lee** | **Date:**  **Review Date:** |