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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 | **Ashanthan Mudaly, Andrew Goode** |

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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. | Blackjack: Man & Machine is an innovative blend of robotics, virtual control, and interactive gaming. The project features two robots: one as the dealer that autonomously deals cards, and the other as a card-checking robot that reads and verifies the dealt cards. Players can engage with the robots either by participating virtually, controlling the card-checking robot remotely, or by playing blackjack in person against the robot dealer. This project merges human strategy and robotic precision, creating an exciting and futuristic twist on the classic card game of blackjack.  For the live demonstration, we will be using the DoBot Magician to perform the core movements required for playing, card-checking, and bet allocation. These movements will first be simulated in MATLAB, where the robot's actions are carefully designed and monitored to prioritise safety and precision. Once the simulations are complete, they will be translated into real-time actions executed by the DoBot Magician. This activity highlights the seamless integration between virtual modelling and physical robotics, ensuring a smooth and safe performance.  Top of Form | | | | | |
| 1. HAZARDS: Choose those hazard types that will need to have control measures in Section 4 (Those that DO NOT apply are crossed out) | | | | | | |
| **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**   **(Those that DO NOT apply are crossed out)** | | | | | | |
| **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**   * **Emergency stop button on DoBot Magician both in software and hardware** | | | | | | |
| 1. **PPE REQUIRED (Tick those that apply)** | | | | | | |
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| 1. **EMERGENCY EQUIPMENT** | | | | | | |
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| 1. **work activity steps** | | |
| \*\*BEFORE YOU START:\*\*  - Simulate the movements of the arm  - Get confirmation the movements are safe to demonstrate  - Obtain permission to use the arm from lab staff or the coordinator.  - Ensure the workspace is clear, remove potential trip hazards, limit the number of people in the area, and wear appropriate PPE.  - Consult with the Lab Supervisor to confirm that the DoBot Magician arm will not obstruct or damage the surroundings.  - Keep objects and personnel at least 500 mm outside the working radius of the arm.  \*\*STEPS IN WORK ACTIVITY:\*\*  - Position the robot at the desired starting location.  - Upload the necessary code to the terminal.  - Stay outside the working radius of the robotic arm.  - Announce to the room the robot will be moving  - Execute the code to begin operation.  - Operators must remain aware of the moving components and stay focused on their movements.  - Allow extra time to ensure the robot does not move suddenly.  - Re-enter the area of operation once the activity is complete.  \*\*EMERGENCY PROCEDURES:\*\*  - Press the emergency button.  - Notify security or dial 6 using the UTS internal phone.  - Inform the Lab Supervisor.  - Access the first aid kit if needed.  \*\*TRAINING REQUIRED:\*\*  - Training on the movement and operation of a Dobot Magician robotic arm.  - Induction into the UTS Mechatronic Lab Workspace. | | |
| 1. **sign off** | | |
| **prepared by:**  **NAME: Ashanthan Mudaly**  **Andrew Goode** | **Lab Supervisor**  **Name: Michael Lee** | **Date: 09/10/2024**  **Review Date: 09/10/2024** |