**Mechatronics**

### Core Competencies

Please note the following are core competencies for the full set of Mechtronics competitions, not all competencies are covered at all stages and levels.

|  |  |
| --- | --- |
| **Core competencies and standards for WorldSkills UK Skills Competitions activities** | |
| **Competency** | **Development of mechatronic systems**  Knowledge and understanding:   * Designing, assembly and commissioning of a mechatronic system * Understand the function, the application and the components of pneumatic systems * Understand the function, the application and the components of hydraulic systems * Understand the function, the application and the components of electric and electronic systems * Understand the function, the application and the components of edrives * Understand the function, the application and the components of industrial robotic systems * Understand the function, the application and the components of PLC systems |
| **Standards** | Competitors shall be able to:   * Carry out system design for a given industrial application * Assemble a machine according to documentation * Connect wires and tubes in a right industrial way * Install, setup and make necessary adjustments to the mechanical, electrical & sensor systems * Commission a machine by auxiliary equipment and together with a PLC using their standards and their documentation |
| **Competency** | **Industrial controllers**  Knowledge and understanding:   * Understand the function, the structure and the operating principles of PLCs * Understand the structure and function of industrial controllers (PLCs) * Understanding of the configuration of the industrial controller and how a software program relates to a machine action. |
| **Standards** | Competitors shall be able to:   * Connect their own PLC with the mechatronic system * Make the necessary configuration of the industrial controller * Configure all aspects of their PLC as required and the associated control circuitry for correct operation |
| **Competency** | **Software programming**  Knowledge and understanding:   * Understanding of programming an industrial software program * Understand how a software program relates to a machine action |
| **Standards** | Competitors shall be able to:   * Write programs to control a machine, and visualise the process and operation using software. * PLC programming, including digital and analogue signal processing, industrial field buses. |
| **Competency** | **Design Circuits**  Knowledge and understanding:   * Knowledge required to design different circuits * Understanding of designing and assembling electrical circuits in machine/controller systems. |
| **Standards** | Competitors shall be able to:   * Design pneumatic, hydraulic and electric circuits * Design the circuits with modern software tools |
| **Competency** | **Analytical Techniques**  Knowledge and understanding:   * Knowledge of analytical fault finding and repairing |
| **Standards** | Competitors shall be able to:   * Find different faults in an analytic way in a mechatronic system * Repair components in short time. * Demonstrate mastery of problem-solving techniques to ensure correct and safe machine operation. * Optimise a mechatronic system consisting of different modules |
| **Competency** | **Mechanical Design**  Knowledge and understanding:   * Knowledge of designing and assembling mechanical systems including pneumatic and/or hydraulic systems, their standards and their documentation |
| **Standards** |  |