**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.

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| **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
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| **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
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| **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.
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| **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
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| **Competency** | **Software programming**Knowledge and understanding:* Understanding of programming an industrial software program
* Understand how a software program relates to a machine action
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| **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.
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| **Competency** | **Design Circuits**Knowledge and understanding:* Knowledge required to design different circuits
* Understanding of designing and assembling electrical circuits in machine/controller systems.
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| **Standards** | Competitors shall be able to:* Design pneumatic, hydraulic and electric circuits
* Design the circuits with modern software tools
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| **Competency** | **Analytical Techniques**Knowledge and understanding:* Knowledge of analytical fault finding and repairing
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| **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
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| **Competency** | **Mechanical Design**Knowledge and understanding:* Knowledge of designing and assembling mechanical systems including pneumatic and/or hydraulic systems, their standards and their documentation
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| **Standards** |  |