# Hardware design HWDE

Specifying and designing hardware systems and components to meet defined requirements by following agreed design principles and standards.

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| **Guidance Notes:**  The scope encompasses a wide range of hardware systems and components, including but not limited to processors, specialized computing units, embedded systems, control systems, and various sensor and actuator devices. The hardware design should factor in integration needs with IT infrastructures, networking environments, as well as systems architectures such as cloud service models, edge computing, and cyber-physical systems.  Activities may include , but are not limited to:   * defining how hardware components fit into the system architecture and integrate with software, firmware and other systems * selecting, designing, specifying, integrating and prototyping hardware components and subsystems * considering target environments, performance, security, safety, reliability, sustainability, and compatibility requirements * adhering to industry standards including compatibility, safety, security, reliability and sustainability |

## Level 2

Assists in the design of simple hardware components or subsystems under guidance.  
Follows established design principles, patterns, and methodologies as directed. Participates in the translation of logical designs into physical implementations.  
Tests hardware components or subsystems against provided specifications and documents results. Contributes to the documentation of hardware designs using required standards, methods, and tools.  
Seeks guidance and support for deviations from standard practices or when facing unfamiliar scenarios.

## Level 3

Follows selected standard approaches and design patterns to design simple hardware components.   
Seeks guidance when deviating from established design patterns. Takes account of target environment, performance, security, safety, reliability and sustainability requirements.  
Translates logical designs into physical designs. Tests the performance of prototypes and production output against specification.  
Submits hardware designs for approval. Documents all work using required standards, methods and tools.

## Level 4

Designs hardware components, taking account of target environment, performance, security, safety, reliability and sustainability requirements.   
Translates logical designs into physical designs and delivers technical prototypes of proposed components for approval and production.   
Designs the tests to measure the performance of prototypes and production output against specification and inform iterative development.

## Level 5

Specifies and designs complex hardware components/systems.   
Selects appropriate design standards, methods and tools, consistent with agreed enterprise policies and ensures they are applied effectively.   
Undertakes impact analysis on major design options and assesses and manages associated risks. Ensures that hardware designs balance functional, quality, safety, security, systems management, reliability and sustainability requirements.   
Reviews others' designs to ensure selection of appropriate technology, efficient use of resources, and effective integration of multiple systems and technology. Contributes to policy for selection of components.

## Level 6

Provides overall direction and leadership in the hardware design practice within an organisation.   
Influences industry-based models for the development of new technology and components.   
Develops effective procurement strategies, consistent with business needs.   
Drives adoption and ensures adherence to organisational policies, strategies and standards for hardware design.