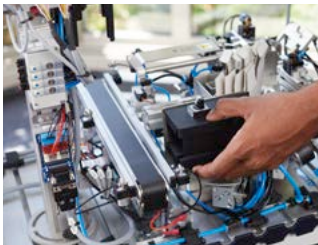




Hardware requirements

Siemens Mechatronic Systems Certification Program (SMSCP)
[siemens.com/sitrain-smscp](https://www.siemens.com/sitrain-smscp)



Systems meeting the SMSCP hardware requirements

1. Amatrol Mechatronic System
2. Encon-Koester Mechatronic System
3. Festo Modular Production System (MPS 203) I4.0

SMSCP partner schools must have a modularized mechatronic system, which includes the following components:

Level 1 – requirements

Basic electrical components

Conductors, wires, and terminal blocks
Electrical power supplies (including transformer, rectifier, filter, voltage regulator)
Basic electrical components (e.g. resistors, potentiometers, capacitors, inductors, diodes, and transistors)
Relays, contactors and solenoids
Overcurrent protection devices (fuses and circuit breakers)
Sensors (inductive and capacitive sensors/ photoelectric sensors/proximity and limit switches (mechanical, reed))
Measuring devices (multimeters, oscilloscopes)
DC motors and control circuits (direction control/speed control)

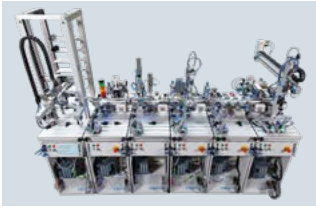
Basic mechanical components

Chain, belt, and gear drives
Bushings, bearings, and gearboxes
Clutches and brakes
Conveyor belts, lifts, chutes, and component storage
Grippers, jaws, and pivot devices
Fasteners, supports, and springs



Pneumatic/hydraulic components

- General components (pressure source (compressor/pump)/ pressure regulation valve with filter and gauge/shut-off valve)
- Pneumatic actuators/cylinders
- Pneumatic gating, valves, and flow control (different DCV designs (e.g. 2/2-, 3/2-, 4/2-, 5/2-, 5/3-way)/flow control valves)



PLC components

PLC components must be SIMATIC S7-1500 with Industrial Ethernet PROFINET interface (legacy systems SIMATIC S7-300 are acceptable if the hardware already exists at your educational institution)

- Personal computer with PLC engineering software (e.g. SIMATIC S7 in TIA Portal, SIMATIC STEP 7 Professional)
- Digital input and output modules for the SIMATIC PLC/control panel with (illuminated) Siemens SIRIUS ACT pushbuttons, switches (n.o./n.c). and indicators

Level 2 – additional requirements

Electrical components

- Analog sensors such as ultrasonic- or hall-effect sensors

Electrical machines

- Step motors
- Single-phase and three-phase AC motors
- Direction control
- Speed control – variable frequency drives (SINAMICS G120)

Guards and mechanical safety devices

PLC-related

- Simulation software for PLC e.g. S7-PLCSIM or S7-PLCSIM Advanced
- Analog input and output modules for the SIMATIC PLC or optional analog input and output modules with SIMATIC ET 200SP PROFINET remote IO system
- SCALANCE XC208 manageable layer 2 IE switch

SIMATIC TP700 Comfort Panel with HMI panel engineering software (e.g. TIA Portal SIMATIC WinCC Advanced)

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