CTE Frameworks - Robotics and Automation Engineering Technology Equipment List

August 2024



## Suggested Equipment List

### Safety Equipment

* Safety Glasses or Goggles
* Face Masks
* Antistatic Wrist Straps and Mats
* Fire Extinguishers: Specifically rated for electrical fires (Class C)
* Fire Blankets
* First Aid Kits
* Voltage Warning Signs
* Other Safety Signage and Emergency Procedure Posters
* Safety Data Sheets (SDS)
* Emergency Shutoff Switches
* Ground Fault Circuit Interrupters (GFCIs)
* Circuit Breakers

### Classroom Technology

* High-Performance Computers
* Networking Hardware (Routers, Switches, Access Points)
* CAD Software, Solidworks or AUTOCAD
* PLC Programming Software, such as MATLAB/Simulink
* Programming IDEs, such as Python, C++, or specific IDEs for microcontrollers, e.g., Arduino IDE.
* Project Management Software
* Document Scanners
* Online Collaboration Tools, e.g., Platforms like Microsoft Teams
* Virtual Oscilloscopes and Function Generators
* Digital Storage Solutions
* Interactive Whiteboard or Smartboard
* Projector
* Document Camera
* 3D Printer

### Robotics Kits and Platforms:

* Educational Robot Kits: Such as VEX Robotics, LEGO Mindstorms, or Arduino-based kits for hands-on learning.
* Industrial Robots: Small-scale industrial robots (like those from FANUC, ABB, or KUKA) for advanced students.
* Mobile Robots: Kits like TurtleBot or ROS-compatible platforms for teaching autonomous navigation.

### Programmable Logic Controllers (PLCs):

* PLC Units: Such as Siemens S7, Allen-Bradley, or Mitsubishi PLCs.
* PLC Training Kits: Including input/output modules, sensors, and actuators for practical PLC programming.

### Sensors and Actuators:

* Proximity sensors, ultrasonic sensors, temperature sensors, etc., for interfacing with robots and automation systems.
* Actuators: Including servo motors, stepper motors, pneumatic actuators, and hydraulic actuators.

### Measurement and Calibration Tools:

* Calipers and Micrometers
* Laser Measuring Tools**:** For aligning and calibrating robotic arms and systems.

### Network and Communication Tools:

* Networking Equipment: Routers, switches, and cables for connecting PLCs, robots, and computers in a local network.
* HMI Panels: For creating and testing Human-Machine Interfaces.

### Testing Equipment

* Digital Multimeters
* VOM Meters (Volt-Ohm-Milliammeter)
* LCR Meter
* Digital Storage Oscilloscope (DSO)
* Signal Generators and Spectrum Analyzers
* Digital Logic Analyzers
* Function/Signal Generators
* DC Power Supplies
* Component Kits: Including resistors, capacitors, inductors, diodes, transistors, LEDs, switches, and ICs.

### Power Tools

* Cordless Drills and bits
* Impact Driver
* Dremel
* Rotary Tools
* Electric Cable Cutters
* Heat Gun
* Power Strippers
* Vacuum or Blower

### Hand Tools

* Wire Cutters
* Wire Strippers
* Cable Strippers
* Precision Flush Cutters
* Needle-Nose Pliers
* Bent-Nose Pliers
* Combination Pliers
* Precision Screwdrivers
* Magnetic Screwdrivers
* Insulated Screwdrivers
* ESD-Safe Tweezers
* Crimping tools
* Soldering Iron
* Desoldering Pump (Solder Sucker)
* Soldering Iron Stand
* Solder Wick (Desoldering Braid
* Calipers
* Clamps and Holders, Helping Hands (Third Hand Tool)
* PCB Holder or Vise
* Cable Marking Tools, Permanent Markers, PCB Etching Pen
* Cleaning Kits (Swabs, Alcohol, Lint-Free Cloths)
* Antistatic Brushes
* Jumper Wires
* Heat Shrink Tubing and Electrical Tape
* Storage Cabinets and Cable Organizers