

# of Units	Laboratory Equipment Description	NC3 Required Equip description
10	AC/DC Training System: Oscilloscope D:L Scope DIG 50MHZ 2-16; AC/DC Training System (Manuals on CD-ROM)	The NC3 national certification courses have been specifically developed to give students the knowledge and skills required to enable them to work safely and effectively with electricity. The industrial approved equipment is FESTO AC/DC training suitcase with Oscilloscope, DC power source (protected), AC power source (protected), A selection of resistors, Inductor, parallel-connected to a fluorescent light, Two capacitors ,Transformer, a selection of switches: SPST,SPDT, DPDT, NO push button, NC push button, selector switch, knife switch, DC relay, AC relay, A selection of indicator lights: green, yellow, red, Potentiometer, DC motor, Solenoid, Buzzer, Circuit Breaker with test components, Fuse.

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5	Learntop-S, Bench Learntop-S, Aluminum profile plate, cable guide & hose holder, Hydr. Pwr Unit, H oil, Hose Lines w/ Quick release, pressure relief Unit; TP 101 America & TP 501 America/TP 101+ America, TP 501+ America (Troubleshooting) Equipment Sets, Tubing Cutter; Courseware: TP101, TP501 (manuals on CD), FluidSim P (7seats), FluidSims H (7seats) + Additional License network version (2); Funnel & Compressor	This hydraulic training course is designed to familiarize students with the construction and operation of hydraulic components. Investigating the construction and operation of a range of hydraulic equipment, this hydraulic training course covers the fundamental principles of hydraulics as well as the individual components. Valves controlling pressure, flow rate, sequence and direction of flow are included and practical exercises are used to demonstrate their operation, based on standard symbol circuits. Maintenance and a systematic approach to fault finding are also covered; NC3 Required approved industrial equipment Festo Hydraulic trainer engineered for extreme ease of use and durability, Exceeds industrial safety standards, Many work surface options, including an "A" frame top to allow experiments on both sides of a bench, Lockable storage available, Industrial-grade components pre-labeled with appropriate circuit symbol, providing learning reinforcement, Teachers can create their own circuits to reproduce specific hydraulic applications, Faulty component package for real-world troubleshooting, Electro Hydraulics and ElectroPneumatics included

		This pneumatic training course covers the use of compressed air for pneumatic control and as a signaling medium. A complete overview is given, covering compressors, storage, dryers and distribution as well as the design, construction and operation of a range of actuators, valves and ancillary equipment. The relevant ISO symbols are introduced and included in the circuit diagrams. This course ensures a sound competence the safe operation and maintenance of one of the most common automation elements in industry. Industrial-grade components pre-labeled with appropriate circuit symbols, providing learning reinforcement, Repositionable components build a foundation of knowledge one device at a time, making it easier to teach circuit assembly, Teachers can create their own circuits to reproduce specific pneumatic applications, Pneumatic trainer engineered for extreme ease of use and durability, Exceeds industrial safety standards, Faulty component package for real-world troubleshooting, NC3 Equipment and curriculum must be part of training unit
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5	Motor & Industrial Controls; Mobile Workstation, Push Buttons, Switches, Pilot Lights, 3-Phase Manual Starter, Cam Switch, Starting Resistors, Student/Instructor Manual	

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10	MecLab® Table Top Mechatronics - The complete package; Handling Station / Storage unit, Conveyor Station / Storage unit, Stacking Station / Storage unit, Air Compressor, FluidSim Simulation Software	NC3 Introduction to Mechatronics Certification course aims to relay foundational information and develop hands on skills in the areas of Mechanical, Electrical, and Control Technology. Around competencies to operate and maintain pneumatics, electricity, sensors, actuators, and controls. Festo MecLab is certified approved equipment to utilizing real-world automation devices and students will also gain additional skills in STEM (Science, Technology, Engineering, and Math). Festo approved Industrial equipment is also the only approved equipment for Skill USA in Mechatronics - Three complete stations: Conveyor, Stack Magazine, and Handling, Each station is assembled and ready for use, Only real-world industrial components are used to withstand the rigors of a training environment, Lockable & stackable storage containers are included, Package comes as a turn-key solution including: • Portable air compressor • 18 Licenses of FluidSIM design and control software• All needed tools and accessories• Complete documentat sp
4	Workstation Package (US customary units); Work Bench for Mechanical Drives Learning System - Level 1, Level 2 / Campus License Mechanical System Level 1, Campus License Mechanical System Level II	The national NC3 certification will cover the industrial applications Mechanical Systems. Gears, drives, bearings, pulleys, and more will make up the the Mechanical Systems course. Festo Mechanical workstation is the certified approved equipment which will cover the students in installation, use, maintenance, and troubleshooting of mechanical drive components and systems, which will familiarize in the components encountered in industry. Festo Mechanical Workbench includes: Modular system to fit different training needs and budgets, Heavy-duty equipment with industrial components ,Fully illustrated job sheets direct students to complete tasks safely and efficiently ,Lockout/tagout on the disconnecting switch and safety panels ensure student safety, Working space can be increased by adding a slave base unit, Universal base unit can be mounted on a regular table as well as optional benches, Quality industrial components are mounted on panels for storage and inventory control, Cost-effective solution with compreh specific hydraulic applications, Faulty component package for
1	CIROS Robotics (16 Education + 1 Studio)	NC3 National Certification of Fundamentals for Programming Robotics, this course is designed expose students to the various types of robots and the various ways they can increase productivity in industrial applications. Festo Robotic software trademark name CIROS Allows students to simulate and control the operation of various brands and types of robots, Control the robot movements using "articular" and/or "Cartesian" coordinates ,Multi-seat licensing and transfer of files between computers, Various application models to choose from for real-world applications (many robot models to chose from Kuka, Fanuc, ABB, etc.), Control/simulation software program simulates and controls with three-dimensional representations of the mechanical and electrical characteristics of the equipment.
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2	FANUC Robot MPS-D and Assemble Cell with Enclosure	NC3 Industrial Certification Applied Robotics Course expands on Robotics Fundamentals. Students will have more of a hand-on training with the CIROS software and real industrial Festo Fanuc robotic applications. The Festo MPS Robot Cell allows students to learn about these topics and how to program and edit robot programs and positions to accomplish various tasks. NC3 certified approved Festo assembly Station; The Festo Robot and Assembly station is based on the proven design of the Festo MPS® and can easily be integrated with upstream and/or downstream stations. The robot determines the orientation of the bodies and places them in the assembly holder in the correct orientation. It takes the piston from the pallet and assembles it in the body. Controlled magazines feed the piston springs and cylinder end caps to the robot. The fully assembled pneumatic cylinder is then placed on a slide. The system includes: Trolley with Safety Guarding System ,Industrial Robot (Fanuc),Handling Module, Assembly module.
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# of Units	Laboratory Equipment Description	NC3 Required Equip description
1	On-Line Course / Introduction to Industry 4.0 Level 1 NC3 Cer	NC3 Certification "Introduction to Industry 4.0", this course aims to relay foundational information about Industry 4.0 and help to establish a base upon which more detailed information regarding the topic can layered. The course introduce the various industrial revolutions and how Industry 4.0, the internet of things, smart factories, and cyber-physical systems are a disruption to the manufacturing industry and discusses the impact and implications that these advancements introduce. Explain what Industry 4.0 is ,Discuss how these changes impact the industry, current and future employees, and other members of the manufacturing value chain ,Give examples of the benefits and value of Industry 4.0, Explain the 'interconnected world', Define important terms, theories, and ideas behind Industry 4.0
1	MPS 403- Industry 4.0 Level 2 NC3 Certification, Siemens Software - 6 Seats, PC Adapter, Compressor	Building upon the base knowledge gained in the Level 1 Industry 4.0 Course, students will delve deeper into the IIOT (Industrial Internet of Things) as it applies to modern production systems. Much of the focus will be on how MES (Manufacturing Execution Systems) send and receive data from the production process. Participants will work with the MES and learn how to process, utilize, and protect critical data. The students will work with real production scenarios and real-world industrial equipment to incorporate HMI (Human Machine Interface) with the MES and equipment. Applied Industry 4.0 topics will be learned on Festo MPS403 I4.0. <b>It is comprised of 3 stations and includes:</b> <ul style="list-style-type: none"> <li>- Set-up and optimization of material flow</li> <li>- Optimization of setup times</li> <li>- Material flow control</li> <li>- Enhanced I/O communication</li> <li>- RFID technology</li> <li>- Network technology</li> <li>- Condition monitoring</li> <li>- Web services</li> <li>- MES (Manufacturing Execution Systems, Software)</li> </ul> MPS-403 I4.0 system will apply to the Product ID and I4.0 certification. This system can also

Festo Equipment Description	Price per each and total
<p>The AC/DC Training System is a state-of-the-art training system that is specifically designed to introduce students to the basic principles of electrical circuits, both in direct current (dc) and alternating current (ac). It provides a comprehensive, high-quality, and cost-effective solution to rapidly build student knowledge in electricity and electrical circuits. Through theory and hands-on exercises, the AC/DC Training System fully covers the following topics: nature of electricity, Ohm's law, Kirchhoff's voltage and current laws, using measuring instruments, solving series and parallel circuits, electromagnetism, electrical distribution, and troubleshooting electrical circuits. NC3 equipment and curriculum must be part of training unit</p>	<p>\$ _____ each</p> <p>_____ total \$</p>

Festo Equipment Description	Price per each and total
<p>TP 501 America now combines the proven learning approach through object-oriented courseware from Lab-Volt with the project-orientation from Festo Didactic. The hydraulic hoses are equipped with leakage-free, self-sealing couplings in high-grade stainless steel that are easy on the environment and reduce contamination. The Spring Load for Cylinders comes with a safety cover to prevent potential -hazards when high forces are involved. Easy and precise switching of hand-lever valves.</p> <p>Ergonomic handwheels with a high resolution allow the simple and precise setting of the flow and pressure valves.</p> <p>Tool-free, single-hand operation with Quick-Fix mounting system.</p> <p>The equipment trays fit exactly into the drawers in Learnline/Learntop workstations.</p> <p>The trays are compatible with the Systainer suitcases for enhanced mobility.</p> <p>The solid aluminum structure and profile bars can support heavy components without twisting or bending.</p> <p>Easy and precise positioning of components along the profile groove, Equipment set TP 501+ from Festo Didactic is an extension to equipment set TP 501. TP 501+ contains components with specified, realistic defects. It enables hydraulic circuits to be constructed with the TP 501 and individual components to be replaced by defective ones. Equipment must meet NC3 Level 1 and 2 and include NC3 curriculum</p>	<p>\$ _____ each</p> <p>_____ total \$</p>

<p>TP 101 America now combines the proven learning approach through object-oriented courseware from Lab-Volt with the project-orientation from Festo Didactic. First, at the beginning of each exercise, meaningful objectives are clearly stated. Then, the theory to attain these objectives is laid out extensively, with an emphasis on component description. Next comes the laboratory procedure itself. In this section, students follow precise and safe working instructions designed to teach them the practical principles related to the stated objectives. The most important components at a glance</p> <p>Lockable on-off valve with -filter regulator (Order no. 4795290)</p> <p>Pressure gauge (Order no. 152865)</p> <p>One-way flow control valve (Order no. 193967)</p> <p>3/2-Way-Panel mounted with Pushbutton Actuator, normally closed (Order no. 152860)</p> <p>3/2-Way- Panel mounted Valve with Pushbutton Actuator, normally open (Order no. 152861)</p> <p>5/2-way double pilot valve, pneumatically actuated on both sides (Order no. 576303)</p> <p>Single-acting cylinder (Order no. 152887)</p> <p>Double-acting cylinder, smooth running (Order no. 4809915)</p> <p>Double-acting cylinder (Order no. 152888)</p> <p>Air pressure reservoir, 0.4 l (Order no. 152912)</p> <p>Vacuum generator, type H (Order no. 573258)</p> <p>Vacuum gauge (Order no. 573042)</p> <p>Suction gripper 20 SN (Order no. 573043)</p> <p>Plastic tubing</p> <p>Manifold (Order no. 152896)</p> <p>Contact tachometer (Order no. 8062148)</p> <p>Spring load for cylinders, pneumatic (Order no. 4646789)</p> <p>Compressed air motor (Order no. 4645172)</p> <p>Air Bearing (Order no. 4809899)</p> <p>Flow indicator with float, pneumatic (Order no. 4741762)</p> <p>Pneumatic resistance, long (Order no. 4646991)</p> <p>Pneumatic resistance, short (Order no. 4809992)</p>	<p>\$ _____ each</p> <p>_____ total \$</p>
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<p>The Industrial Controls Training System, have unique controls training capabilities, which are enhanced by its modularity and its instructor-inserted faults (up to four faults per module). The system allow the student to select and mount control devices to form typical control circuits, and to troubleshoot them once a fault is inserted.</p> <p>The Motor/Industrial Controls Training System is divided into four levels, each level being further divided into specific topics that deal with various aspects of industrial controls equipment operation. The Basic Controls system provide the student with a complete basic training in motor controls. The Motor Drives system introduce the use of the DC and AC drives. The Sensors system introduce photoelectric and proximity switches.</p> <p>The Series control devices and motors are standard industrial quality, preset to work with the 0.2 kW machines in the Electromechanical Training System. Each module are equipped with up to four faults that can be inserted by the instructor using switches mounted behind the faceplate. Typical faults include open coils and contacts, dirty contacts, shorted connection, and crossed wires.</p> <p>All components and exercises contained in Basic Controls, Motor Drives, shall be simulated by the Windows®-based Lab-Volt Industrial Controls Simulation Software. The simulated components can be interconnected, and their operation studied, using the same courseware as that used for the real equipment. Future NC3 certification required</p>	<p>\$ _____ each</p> <p>_____ total \$</p>

<p>The system shall cover the following topics with hands-on exercises:</p> <p><u>Basic Controls</u>; Basic Principles of Electric Motor Control, Lockout/Tagout Procedure, Control Panel Devices, Manual Starters, Contactors and Control Relays, Current Protection Devices, Circuit Layout and Specifications, Specifications Reading, Symbols, Designations, and Diagrams, Basic Control Circuits, Motor Starters, Two-Wire and Three-Wire Controls, Manual Reversing Starters, Reversing Starters, Multiple Push Buttons, Jogging Control Circuits, Friction Brakes, Motor Starter with Jogging, Reversing Starter with Jogging, Reduced AC Voltage Starters, Primary Resistor Starters, Soft Starters, Time Relay Circuits, Time Relays, Plugging with Time Relays, Primary Resistor Starters with Time Relays</p> <p><u>Motor Drives</u>; AC Drive, AC Drive Overview, Volts per Hertz Characteristics, Ramp and Voltage Boost, Protection, Braking and Jogging, Remote Controls, DC Drive, DC Drive Overview, Current Limiting and IR Compensation, Troubleshooting; Introduction to Troubleshooting, Voltmeter Method of Troubleshooting, Ohmmeter Method of Troubleshooting, Troubleshooting a Basic Electrical Circuit, Troubleshooting Basic Motor Control Circuits, Troubleshooting a Manual Reversing Starter Circuit, Troubleshooting a Motor Starter with Jogging Circuit, Troubleshooting a Plugging with Time Relay Circuit, Troubleshooting PLC Circuits, Troubleshooting a PLC Circuit, Troubleshooting a PLC Reversing Motor Starter with Jogging Circuit , Troubleshooting a PLC Motor Starter with Jogging Circuit, Troubleshooting AC and DC Drive Circuits, Troubleshooting an AC Drive Circuit, Troubleshooting an AC Drive Braking and Jogging Circuit, Troubleshooting a DC Drive Circuit.</p>	<p>\$ _____ each</p> <p>_____ total \$</p>
<p>The training System shall contain the following equipment:</p> <p><u>BASIC CONTROLS</u> - Portable workstation, Selector Switches, Emergency Button, Pilot Lights, Dual Contactors, Lockout Module, Manual Starter, Contactor, Control Relay, Overload Relay, Time Relay, Fuse Holder, Control Transformer, Cam Switch, Inertia Wheel, Starting Resistors, Brake Motor, Soft Starter, AC Power Supply, Connection Leads, Fuse Kit for Fuse Holder, Magnetic Labels Kit , Basic Controls - Student Guide, Basic Controls - Instructor Guide, Troubleshooting - Student Guide, Troubleshooting - Instructor Guide.</p> <p><u>MOTOR DRIVES</u> – Power Diodes, DC Motor, AC Drive, DC Drive, Motor Drives - Student Guide, Motor Drives - Instructor Guide, Troubleshooting - Student Guide, Troubleshooting – Instructor Guide.</p>	<p>\$ _____ each</p> <p>_____ total \$</p>

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<p>The Stacking Magazine station contains a workpiece storage container and a feed separator.</p> <p>The Conveyor station can transport and sort workpieces.</p> <p>The Handling station can grip the workpieces and deposit them at defined points. Start-up instructions: detailed step-by-step instructions showing how to connect the stations to the computer and how to write simple programs, with teacher's tips for lesson planning.</p> <p>Theoretical text with the fundamentals of pneumatics, electrical engineering, electrical actuators, sensors and control technology.</p> <p>Book of exercises with 5-7 exercises per station and prepared worksheets in *.doc format with solutions; these can be easily adapted to meet your particular requirements.</p> <p>Prepared PowerPoint presentations with extensive visual materials for use in class</p> <p>Videos</p> <p>Technical data for all components, Meclab® is delivered in practical, stackable Systainers, which function as storage units as well as transport packaging.</p> <p>Equipment must meet NC3 intro to mechatronics with NC3 curriculum included</p>	<p>\$ _____ each</p> <p>_____ total \$</p>

Festo Equipment Description	Price per each and total
<p>The Mechanical drives learning system exposes students to the hardware, tools, measuring apparatus, and methods used by industrial mechanics to keep plants running. It covers the identification, installation, and troubleshooting of common machine elements, and is suitable for beginners in vocational schools, as well as industrial mechanics who need to refresh their basic skills.</p> <p>Hardware is of industrial-grade, yet small and light enough to be handled by one student. Most of the hands-on exercises take place inside an ergonomic and safe workstation which is the foundation of the system.</p> <p>The Mechanical drives learning system is divided into a Workstation package (required for all topics) and four levels. Each level consists of separate models that include hardware, tools, measuring apparatus, and instructor manuals. Optional topics and hardware are also offered. Mobile workstation with block top, and inventory drawers. Nc3 equipment and curriculum must be provided with training system Levels 1-3</p>	<p>\$ _____ each</p> <p>_____ total \$</p>

Festo Equipment Description	Price per each and total
<p>Modern PC technology allows us to create realistic 3D simulations even for the most complex automation systems. Participants discover the kinetic dynamism of mechatronic systems using virtual reality – without any risk to human or machine. This allows users to take a step into automation technology without any worries, providing a great motivational boost. While virtually commissioning industry control systems and robots, students can use the system simulation to develop sequencing and motion programs, which can then be transferred to the control systems already in place. Must simulate, Fanuc, ABB, Kuka, must meet NC3 level 1 robotics certification.</p>	<p>\$ _____ each</p> <p>_____ total \$</p>

Festo Equipment Description	Price per each and total
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<p>his equipment level is created based on the basic design of the MPS® robot station and the two robot handling and robot assembly modules as a introduction to industrial robotics. The upstream station feeds the bodies of the pneumatic cylinders to be assembled to the robot via a slide. The robot determines the orientation of the bodies and places them in the assembly holder in the correct orientation. It takes the piston from the pallet and assembles it in the body. Controlled magazines feed the piston springs and cylinder end caps to the robot. The fully assembled pneumatic cylinder is then placed on a slide. Topic: Handling and assembly</p> <p>In many industrial applications, robots handle and assemble workpieces and modules. Getting to know these areas of application is an essential part of an introduction to robotics, Integration of an industrial robot in an assembly process</p> <p>Teaching of robots in complex assembly environments</p> <p>Commissioning of complex systems</p> <p>Maintenance, servicing and troubleshooting of complex systems</p> <p>Programming of industrial robots combined with the integration of sensors and additional actuators</p> <p>Programming of multitasking applications, NC3 Level 2 applied robotics, with applications, NC3 equipment and curriculum must be provided</p>	<p>\$ _____ each</p> <p>_____ total \$</p>
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Festo Equipment Description	Price per each and total
	<p>\$ _____ each</p> <p>_____ total \$</p>
<p>The training system MPS 403-1 is designed for training in basic skills and specialist knowledge in the area of automation technology and mechatronics. Taking the form of a miniaturized production line, it also offers an in-depth look into intelligent networking of machines in the production environment, and their work processes. The system consists of three stations: Distributing Pro, Joining, and Sorting Inline. These stations are networked, equipped with several RFID writing and reading heads and intelligent IO-Link-based sensors, and form an autonomous system, With a web-based software environment around an educational MES system, MPS 403-1 offers a wide range of options for learning about the latest technologies for Industry 4.0. This software environment includes an integrated online store, training content such as IoT retrofitting based on mini control systems, touch panel programming, and artificial intelligence with machine learning algorithms. With training programs supported by augmented reality and clear, pedagogical preparation of all content with extensive training materials, this training system is a core component of any modern MPS-based training solution. Equipment must meet NC3 level 2 applied mechatronics with NC3 curriculum</p>	<p>\$ _____ each</p> <p>_____ total \$</p>

**SUBTOTAL:** \$ \_\_\_\_\_

**TAX:** \$ \_\_\_\_\_

**TOTAL BID PRICE:** \$ \_\_\_\_\_

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