AMTEC

Lab Equipment and Resources

AMT 1001: Orientation to Computer Systems
Lab 1: Identify Basic Computer Components
Computer System (with components below)
Computer case (system unit)
Power button (On/Off Switch)
Power cord
CD/DVD drive
Monitor
Keyboard
Mouse
Printer
Lab 2: Use Storage Devices
Computer System with hard drive and My Documents folder
Flash drive or some other portable device
Internet access
Free cloud-based storage account for Dropbox or Google Docs (or equivalent)
Lab 3: Basic Computer Maintenance
Computer System with ability to empty Recycle Bin
Computer System with ability to run Disk Cleanup
Computer System with ability to run Disk Defragmenter
Lab 4: Basic Ergonomic Exercises
No lab equipment needed.

AMT 1002: Operating Systems
Lab 1: Copy and Move Commands
Computer System
Microsoft® Word
Image file
Lab 2: Install a Printer
Computer System with Microsoft® Windows operating system and student access to Control Panel
Printer

AMT 1003: Operating Systems
Lab 1: Create a Document
Computer System
Microsoft® Word (or equivalent word processing software)
Lab 2: Create a Spreadsheet
Computer System
Microsoft® Excel (or equivalent spreadsheet software)
Lab 3: Create a Database
Computer System
Microsoft® Access (or equivalent database software)
Lab 4: Create an Email Message
Computer System

Microsoft® Outlook (or equivalent email management system)
Lab 5: Participate in a Collaboration Session
Computer System
Internet and/or Intranet connection
Collaboration software and/or access to collaboration system

AMT 1004: Internet/Intranet
Lab 1: Web Browsers
Computer System
Internet connection
Web Browser
Microsoft® Word (or equivalent word processing software)
Lab 2: Web Search
Computer System
Internet connection
Web Browser
Microsoft® Word (or equivalent word processing software)

AMT 1011: Fundamentals of Fluid Power & Electrohydraulics/Pneumatics
NO LABS

AMT 1012: Flow, Directional, Pressure Control Valves
Lab 1: Basic Hydraulic & Pneumatic Safety
AMTEC Manufacturing System Simulator (or equivalent)
Lab 2: Familiarization with the Parts of a Basic Hydraulic and Pneumatic System
AMTEC Manufacturing System Simulator (or equivalent)
Lab 3: Starting Up the Power Unit & Adjusting Pressure Relief Valve
AMTEC Manufacturing System Simulator (or equivalent)
Calibrated Master Gage
Set of Hex Head Wrenches
Set of Screwdrivers
Adjustable Wrench
Lab 4: Troubleshooting Hydraulic Control Valves: Disassembly and Assembly of a Two-Stage Directional Control Valve
Two-Stage Directional Control Valve
Set of Hex Head Wrenches
O-ring Pick Set
Set of Screwdrivers
Lab 5: Adjust Flow Control
AMTEC Manufacturing System Simulator (or equivalent)
Allen Wrench Set

AMT 1013: Pumps, Actuators, Accumulators
Lab 1: Basic Hydraulic & Pneumatic Safety

AMTEC Manufacturing System Simulator (or equivalent)
Lab 2: Familiarization with the Parts of a Basic Hydraulic and Pneumatic System
AMTEC Manufacturing System Simulator (or equivalent)
Lab 3: Starting Up the Power Unit & Adjusting Pressure Relief Valve
AMTEC Manufacturing System Simulator (or equivalent)
Calibrated Master Gage
Set of Hex Head Wrenches
Set of Screwdrivers
Adjustable Wrench
Lab 4: Troubleshooting Hydraulic Control Valves: Disassembly and Assembly of a Two-Stage Directional Control Valve
Two-Stage Directional Control Valve
Set of Hex Head Wrenches
O-ring Pick Set
Set of Screwdrivers
Lab 5: Adjust Flow Control
AMTEC Manufacturing System Simulator (or equivalent)
Allen Wrench Set

AMT 1014: Reservoirs, Fluids, & Filters
Lab 1: Maintain Fluid Levels
AMTEC Manufacturing System Simulator (or equivalent)
Hydraulic System with a Cylinder, including the following:
Electric Motor
Reservoir
Hydraulic Pump
Gage
Hydraulic Cylinder
Hydraulic Fluid
Transfer Pump with a 10 Micron Filter (optional)
Wipes or Rags (in case of spill)
Lab 2: Replace Hydraulic Fluids
AMTEC Manufacturing System Simulator (or equivalent)
Hydraulic System with a Spin-On Filter
Hydraulic Fluid
Wipes or Rags (in case of spill)
Spin-on Filter
Filter Strap Wrench

AMT 1015: Hose, Piping, & Tubing
Lab 1: Replacing Steel Tubing Used in Fluid Power Systems
Hydraulic Power System with Steel Tubing
Set of Wrenches up to 1/2" to 1"
Measuring Tape
Tube Cutters

File
Air Drill with Chamfering Tool
Permanent Marking Pen (thin point)
Tubing
Nut with Ferrules or Nut with Compression Ring
Flaring Tool
Air Gun
Lab 2: Replacing Hoses Used in Fluid Power Systems
Hydraulic Power System with Hose(s)
Set of Wrenches up to 1/2" to 1"
Measuring Tape
Silver Pencil
Hose
Hose End Fittings
Crimping System
Chop Saw with an Abrasive Disc Wheel
Air Gun

AMT 1016: Electrohydraulics/Pneumatics
Lab 1: Adjust Pressure Regulator
AMTEC Integrated Manufacturing System (or equivalent)
Lab 2: Flow Control
AMTEC Integrated Manufacturing System (or equivalent)
Allen Wrench Set
Lab 3: Relief Valve
AMTEC Integrated Manufacturing System (or equivalent)
Open End Wrench
Allen Wrench Set
Lab 4: System Limitation & Impact of Pressure
AMTEC Integrated Manufacturing System (or equivalent)
Lab 5: Pressure Accuracy
AMTEC Integrated Manufacturing System (or equivalent)
Lab 6: Adjust Pressures & Flow to Equipment Specifications
AMTEC Integrated Manufacturing System (or equivalent)
Open End Wrench
Allen Wrench Set
Lab 7: Pressure Switch Adjust
AMTEC Integrated Manufacturing System (or equivalent)
Lab 8: Confirm Operation of Switch and Adjust Limit Switch
AMTEC Integrated Manufacturing System (or equivalent)
Allen Wrench Set
Lab 9: Zero & Span
AMTEC Integrated Manufacturing System (or equivalent)

AMT 1017: Systems & System Troubleshooting

Lab 1: Troubleshooting Scenario #1
AMTEC Integrated Manufacturing System (or equivalent)
Lab 2: Troubleshooting Scenario #2
AMTEC Integrated Manufacturing System (or equivalent)
Lab 3: Troubleshooting Scenario #3
AMTEC Integrated Manufacturing System (or equivalent)
VOM
Lab 4: Troubleshooting Scenario #4
AMTEC Integrated Manufacturing System (or equivalent)
VOM
Lab 5: Troubleshooting Scenario #5
AMTEC Integrated Manufacturing System (or equivalent)
VOM
Lab 6: Troubleshooting Scenario #6
AMTEC Integrated Manufacturing System (or equivalent)
VOM
Lab 7: Troubleshooting Scenario #7
AMTEC Integrated Manufacturing System (or equivalent)
VOM
Lab 8: Troubleshooting Scenario #8
AMTEC Integrated Manufacturing System (or equivalent)
VOM

AMT 1021: Basic PM
Lab 1: Safety, Housekeeping, & 5S Practices
AMTEC Integrated Manufacturing System (or equivalent)
Oil filter for Parker DPAK Hydraulic Power Unit or equivalent
Oil and Grease for AMTEC Integrated Manufacturing System or equivalent
Floor Management Development System (FMDS) or screen shots and resources from FMDS
Lab 2: Collect Oil Samples for Analysis
AMTEC Integrated Manufacturing System (or equivalent)
Parker DPAK Hydraulic Power Unit or equivalent
Oil collection kit
Pump for extracting oil
Container for oil sample
Lab 3: Troubleshooting Automatic Lubrication System
AMTEC Integrated Manufacturing System (or equivalent)
Series type automatic lubrication system

AMT 1022: Advanced Technologies in Predictive Maintenance
Lab 1: Vibration Analysis
Trainer with moving components where vibration may be detected
Vibration Analyzer
Computerized Maintenance Management System (CMMS)

Lab 2: Balancing
Trainer with moving components where balance/unbalance may be detected & capable of lockout
Balancing machine
Trial weights
Trim weights
Grinder (optional)
Welding equipment (optional)
Lab 3: Online and Offline Motor Current Analysis
Trainer with electrical motor whose current can be analyzed
Motor Current Analyzer
Lab 4: Infrared Thermography
AMTEC Manufacturing System Simulator (or equivalent)
Infrared Thermography Equipment
Infrared Camera
Computerized Maintenance Management System (CMMS)
Lab 5: Ultrasonic Analysis
AMTEC Manufacturing System Simulator (or equivalent)
Ultrasonic Analysis Equipment
Computerized Maintenance Management System (CMMS)
Lab 6: Predictive Troubleshooting
AMTEC Manufacturing System Simulator (or equivalent)
Vibration Analyzer
Infrared Thermography Equipment
Infrared Camera
Ultrasonic Analysis Equipment
Computerized Maintenance Management System (CMMS)

AMT 1031AB: Introduction to Allen-Bradley PLC's
NO LABS

AMT 1032AB: Allen-Bradley PLC Hardware & Software (I/O)
ALL LABS
ControlLogix®/RSLogix™ 5000 ControlLogix® – No Motion and No Controller (7-slot chassis) Workstation (or equivalent)
Rockwell Automation Catalog Number: ABT-TDCLX2NP
See Customized Configuration Below:
Network hardware
(1) ControlNet bridge module (DELETE)
(2) ControlNet taps (DELETE)
(2) Terminators (DELETE)
Control hardware
(1) 7-slot I/O chassis
(1) 1756 system power supply
(1) DC input module

(1) DC output module
(1) analog input module
(1) analog output module
(1) Programming cable
Operator interface panel
(12) illuminated pushbuttons
(2) potentiometers
(2) analog voltmeters
Added Components
Network hardware
(1) 1756-ENBT or 1756-EN2T EtherNet module (ADD)
Control hardware
(1) ControlLogix Processor (ADD)

AMT 1033AB:Programming Allen-Bradley PLC's
ALL LABS
ControlLogix®/RSLogix™ 5000 ControlLogix® – No Motion and No Controller (7-slot chassis) Workstation (or equivalent)
Rockwell Automation Catalog Number: ABT-TDCLX2NP
See Customized Configuration Below:
Network hardware
(1) ControlNet bridge module (DELETE)
(2) ControlNet taps (DELETE)
(2) Terminators (DELETE)
Control hardware
(1) 7-slot I/O chassis
(1) 1756 system power supply
(1) DC input module
(1) DC output module
(1) analog input module
(1) analog output module
(1) Programming cable
Operator interface panel
(12) illuminated pushbuttons
(2) potentiometers
(2) analog voltmeters
Added Components
Network hardware
(1) 1756-ENBT or 1756-EN2T EtherNet module (ADD)
Control hardware
(1) ControlLogix Processor (ADD)

AMT 1034AB: Allen-Bradley PLC Communication
ALL LABS

ControlLogix®/RSLogix™ 5000 ControlLogix® – No Motion and No Controller (7-slot chassis) Workstation (or equivalent)
Rockwell Automation Catalog Number: ABT-TDCLX2NP
See Customized Configuration Below:
Network hardware
(1) ControlNet bridge module (DELETE)
(2) ControlNet taps (DELETE)
(2) Terminators (DELETE)
Control hardware
(1) 7-slot I/O chassis
(1) 1756 system power supply
(1) DC input module
(1) DC output module
(1) analog input module
(1) analog output module
(1) Programming cable
Operator interface panel
(12) illuminated pushbuttons
(2) potentiometers
(2) analog voltmeters
Added Components
Network hardware
(1) 1756-ENBT or 1756-EN2T EtherNet module (ADD)
Control hardware
(1) ControlLogix Processor (ADD)

AMT 1031S: Introduction to Siemens PLC's
NO LABS

AMT 1032S:Siemens PLC Hardware & Software (I/O)
Lab 1: Getting to Know Your Suitcase Trainer
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs

Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)
Lab 2: Connecting to a PC, Working with Tags, & Simple Seal-In Circuit
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)
Lab 3: Configuring Hardware
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600

16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)
Lab 4: Creating a Base Project File
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)
Lab 5: Working with Analog Signals
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223

Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)
Lab 6: Adding an HMI to the Project File
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)
Lab 7: Simple AND/OR Logic Using Discrete I/O
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234

Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)
Lab 8: Simple AND/OR Logic Using HMI
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)

AMT 1033S: Programming Siemens PLC's
Lab 1: Linear and Structured Programming
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O

6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)
Lab 2: Using the Help System
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)
Lab 3: Timers & Counters
Siemens STEP 7 Professional V12 (TIA Portal)

Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)
Lab 4: Working with Data
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)

Lab 5: Math Instructions
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)
Lab 6: Analog Value Processing
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator

Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)
Lab 7: Programming Languages
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)
3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)

AMT 1034S: Programming Siemens PLC's
Lab 1: Conveyor Lab with Suitcase Trainer
Siemens STEP 7 Professional V12 (TIA Portal)
Siemens S7-1200 Simulator (6ZB2310-0CG00)
Basic Digital and Analog I/O
6" Color Touch Panel Display
Pre-Wired for Siemens Conveyor Belt Model 6ZB2310-0AP00
S7-1200 Power Supply
CPU 1214
Analog output SB1234
Analog in / out SM1234
Digital in / out SM1223
Ethernet Switch CSM1277
Basic Display Panel KTP600
16 Toggle Switches -- digital inputs
16 LEDs -- digital outputs
Potentiometer -- analog input
Siemens Conveyor Model (6ZB2310-0AP00)

3 Proximity Sensors
Light Barrier
Forward-Reverse Belt (Motor) Controls
3 Push Button Switches
Power Indicator
Stop/Start Button
Siemens Conveyor Cable (6ZB2310-0AL00)

AMT 1041: Drafting Fundamentals
Lab 1: Prints & Fundamental Drawing Practices
AMTEC Manufacturing System Simulator (or equivalent)
Prints
1114 - AMTEC - Integrated System Trainer Pneumatic REV0
1114 - AMTEC Manufacturing System Simulator REV1
1114-305 Conveyor Plan View
1390 - Trainer Template - Hydraulic REV0
CMM Part
CMM Part WO P
LH Widget
LH Widget WO P
Mill Block PMC
Mill Block PMC WO P
Step shaft PMC
Step shaft PMC WO P
Basic Drafting Equipment (pencil, paper, etc.)
Lab 2: Print Reading, Interpretation, and Analysis
AMTEC Manufacturing System Simulator (or equivalent)
Prints
1114 - AMTEC - Integrated System Trainer Pneumatic REV0
1114 - AMTEC Manufacturing System Simulator REV1
1114-305 Conveyor Plan View
1390 - Trainer Template - Hydraulic REV0
CMM Part
CMM Part WO P
LH Widget
LH Widget WO P
Mill Block PMC
Mill Block PMC WO P
Step shaft PMC
Step shaft PMC WO P
Basic Drafting Equipment (pencil, paper, etc.)

AMT 1042: Symbols and Schematics
Lab 1: Symbols Recognition and Identification
AMTEC Manufacturing System Simulator (or equivalent)

Prints
1114 - AMTEC - Integrated System Trainer Pneumatic REV0
1114 - AMTEC Manufacturing System Simulator REV1
1114-305 Conveyor Plan View
1390 - Trainer Template - Hydraulic REV0
Lab 2: Electrical & Electronic Circuit Analysis
Print
1114 - AMTEC Manufacturing System Simulator REV1
1114 - AMTEC Manufacturing System Simulator REV1
1114-305 Conveyor Plan View
1390 - Trainer Template - Hydraulic REV0
Lab 3: Piping Diagram Analysis
Print
1114 - AMTEC Manufacturing System Simulator REV1
1114-305 Conveyor Plan View
1390 - Trainer Template - Hydraulic REV0
Lab 4: Hydraulic & Pneumatic Circuit Analysis
Print
1114 - AMTEC Manufacturing System Simulator REV1
1114-305 Conveyor Plan View
1390 - Trainer Template - Hydraulic REV0
Lab 5: Welding Symbols Interpretation
No materials needed
Lab 6: Interpretation of Diagrams and Schematics
No materials needed

AMT 1051: Introduction to Robotics
Lab 1: Safety Devices & Safeguards File
FANUC Robot with following (or equivalent):
FANUC R-30iA Mate Controller
Teach Pendant
Work Envelope
Robot Safeguards
Lab 2: Identifying Standard Operator Panel (SOP)
FANUC Robot with following (or equivalent):
FANUC R-30iA Mate Controller
Lab 3: Familiarization with Teach Pendant
FANUC Robot with following (or equivalent):
Teach Pendant

AMT 1052: Programming/Editing Robots
Lab 1: Robot Start Up, Coordinate Systems, and Motion Systems
FANUC LR Mate 200iC (or equivalent)
Lab 2: Creating and Writing Programs
FANUC LR Mate 200iC (or equivalent)

Computer with RoboGuide Simulation Software
Lab 3: Copying, Deleting, and Editing Programs
FANUC LR Mate 200iC (or equivalent)
Computer with RoboGuide Simulation Software
Lab 4: Programming Instructions
FANUC LR Mate 200iC (or equivalent)
Computer with RoboGuide Simulation Software
Lab 5: File Manipulation
FANUC LR Mate 200iC (or equivalent)
Computer with RoboGuide Simulation Software
Lab 6: Integrated Manufacturing System
AMTEC Manufacturing System Simulator (or equivalent)

AMT 1053: Robot Maintenance and PM
Lab 1: Mastering and Battery Replacement
FANUC LR Mate 200iC (or equivalent)

AMT 1054: Troubleshooting Robots Using Error Codes
Lab 1: Troubleshooting Robots Using Error Codes
FANUC LR Mate 200iC (or equivalent)
FANUC Robotics Handling Tool Application Programming Training Manual

AMT 1055: Integration of PLCs with Robotics
Lab 1: AMTEC Manufacturing System Simulator
AMTEC Manufacturing System Simulator (or equivalent) with the following:
FANUC LR Mate 200iC (or equivalent)
Allen-Bradley CompactLogix PLC (or equivalent)
Siemens S7 PLC (or equivalent)

AMT 1061: Fundamentals of Controls & Instrumentation
Lab 1: Troubleshooting a Power Supply
120 volt AC Power
Customized Power Supply Printed Circuit Boards
Oscilloscope
Voltmeter
Lab 2: Soldering
Soldering iron (with holder and sponge)
Solder
10 and 12 gauge wire with vinyl insulation
12 gauge wire with varnish insulation
12 gauge Stranded wires
Wire Terminal
Blank Printed Circuit Board
Resistor ½ watt
Pulley (2 ½ inch diameter)

De-soldering Tool
Knife
Sandpaper

AMT 1062: Sensors & Photoeyes
Lab 1: Inductive Proximity Sensor
Allen-Bradley inductive proximity sensor 871TM-DH5NP18-H2
Variable 0-30 volt DC power supply
DC motor with a gear attached to its shaft
Oscilloscope
Connector cables
5.6KΩ resistor
1/4-inch diameter ferrous metal rod 3 inches long
2" X 2" X 3/8" pieces of the following materials:
Soft Steel
Brass
Glass
Aluminum
Plastic
Magnet
De-soldering Tool
Knife
Sandpaper
Lab 2: Capacitive Proximity Sensor
Allen-Bradley capacitive proximity sensor 875CM10NP30D4
+24v DC power supply
2" × 2" × 3/8" sample of the following materials:
soft steel
brass
glass
plastic
Glass jar 8 inches tall, half-filled with water
Plastic container 2" high and 1 1/2" in diameter
Plastic container 2" high and 2 1/2" in diameter
Typing paper and pencil
Small slotted screwdriver
Lab 3: Hall-Effect Sensor
Hall-effect sensor - ZH10 Invensys Sensor Systems
DC power supply +24 volt
10KΩ Resistor
Typing paper
Small bar magnet
Large bar magnet
2 - Soft iron Concentrator, (1/2" in diameter, 3/8" long)
DC Voltmeter (analog recommended)

Lab 4: Retro-Reflective Optical Sensing
+ 24 Volt DC power supply
Allen-Bradley retro reflective sensor 42GRU-9000-QD
Allen-Bradley 3 inch diameter reflector 9239
Protractor
4" × 6" mirror
2' × 1' sheet of white poster board, a pencil and an eraser
3" diameter reflector tape
6" × 6" cardboard with 3/4-inch diameter hole
4" × 6" flat (non-glossy) black cardboard
4" × 6" sheet metal
4" × 6" Plexiglas
Small slotted screwdriver
Lab 5: Thru-Beam Optical Sensors
+24v DC power supply
Allen Bradley opposed optical sensor emitter 42 GRL-9000-QD
Allen Bradley opposed optical sensor detector 42 GRR-9000-QD
Connection cables
Several sheets of white typing paper
3 Wooden dowels, 8 inches long, 1/8, 1/4, and 1/2 inches in diameter
Lab 6: Pressure Readings with a Manometer
Regulated variable air pressure supply, 0-30psi
(2) In-line pressure regulators—Control Air Inc., Type 700BD-B, 0-30psi
(2) Air pressure gauges—Omega Engineering Inc. 0-30psi, PGS-25B-30
Manometer, Dwyer 12-W/M
1/4-inch flexible tubing, various lengths
Various 1/4 inch tees and plugs for hose connections
Lab 7: Thermistor
Dual voltage DC power supply
741 IC operational amplifier
Thermistor
47 light bulb with socket
47 Ω resistor
1KΩ resistor
2.7KΩ resistor
(2) 10KΩ resistors
200KΩ resistor
SCR - S4006L
SPST switch
Decade resistance box
Multimeter
Lab 8: Resistance Temperature Detector (RTD)
Thermometer
RTD Probe, 100 Ω platinum, alpha 385, Sensor Tec Inc.
(1) Coffee pot
Ohmmeter

Old metal coffee pot
Dewar flask or pot (1 Qt) with ice and water
Lab 9: Thermocouple Sensor
Type J thermocouple probe, Sensor Tec Inc.
(2) Sets of Type J thermocouple couplers and extension wire
Wire nut
Coffee pot
Dewar flask or 1 Quart pot
Ice and water
Thermometer
Voltmeter
Lab 10: Purge Level Measurement Method
Newport panel meter - Model 205E
P/I transmitter Dwyer 604MS - 151
60" graduated beaker
0-20 psi air pressure supply line
Pressure regulator, Control Air Inc., Type 700BA-B, 0-2psi,
Pressure gauge, Dwyer P/N 2-50-60 (0 - 50 inches H 2 O)
DC power supply (+24 Volt)
Milliammeter
1/4 inch plastic flexible tubing and tee connections
Lab 11: pH Measurements
pH meter
(2) Eyedroppers
(2) Watch glasses
Red litmus
Blue litmus
Plastic medicine bottle
Container A - HCI, 8.55ml/L for .IN
Container B - NaOH, 40g F.W., 4.0g/L for .IN
Container C - pH7 buffer with distilled water
Container D - .5G citric acid per liter
Container E - 1.5 g of baking soda per liter
Lab 12: Humidity Measurements
Dew Point Apparatus
Rubbing Alcohol

AMT 1063: Calibration & Loop Tuning
Lab 1: Tachometer Velocity Stabilization
Digiac Model 711 DC Servo Controller (or equivalent)
Multimeter
Lab 2: Time Proportioning DC Control Circuit
DC power supply 15 V
Two Channel oscilloscope
Signal generator (saw tooth 10 V p-p)

DC voltmeter
Op amp IC - LM311
(2) 5.1v zener diodes
2.5v zener diode
(2) 1KΩ resistors
10KΩ potentiometer
Lab 3: Open-Loop Position System
Model 711 DC Servo Controller (or Equivalent)
Multimeter
Lab 4: Closed-Loop Position System
Model 711 DC Servo Controller (or Equivalent)
Multimeter
Lab 5: Instrument Calibration Procedure
DC power supply 0-24 volts
Voltage-to-Current transmitter (0-10 volt, 4-to-20mA), JH Technology, Model JH200
DC Ammeter
Multi-turn potentiometer (5-turn)
Pulley (2 ½ inch diameter)
String (20") with 1/10 pound weight and float
Connection wires
2 gallon fish tank
Ruler (inch scale)
Lab 6: Tuning a Controller
Simulation Software, OR
Actual Closed Process with a Controller
Lab 7: P&ID Drawings
Reference book on P&ID symbols
Paper, pencil straight edge, and template, **OR**
CAD software (optional)

AMT 1064: Final Control Elements
Lab 1: Incremental Encoders
Incremental Encoder, Dynapar Model E1110240200 (Alternative Encoder - Inertial/Friction Load Unit [Lab Volt 9320])
+5 VDC power supply
(8) 68Ω resistors
(8) LEDs
SPDT switch
0.1 mfd capacitor
7400 quad NAND gate IC
7404 inverter IC
(2) 74193 IC Synchronous up/down counters
74121 One-shot IC
Lab 2: Absolute Encoder

Dynapar absolute gray code wheel, A2510240100 (Alternative Encoder - Digiac Model 711 DC Servo Controller)
+5v DC Power Supply
(8) LEDs
(8) 68Ω resistors
7486 logic IC (Exclusive Or gate)
7404 logic IC (Inverter)
(3) 7476 logic ICs (JK-flip-flops)
TTL logic data manual (for IC pin layout reference)
Signal generator (TTL Output)
Lab 3: Feedback Tachometer
Digiac 711 DC Servo Controller
Multimeter
Lab 4: DC Shunt Motor
DC Shunt Motor
DC Generator
DC Power Supply
Dynamometer
(3) Multimeters
Connecting Cables
Tachometer
Lab 5: Stepper Motor
1 Power Supply 0 – 24V DC at 1 Ampere and 5V DC at 1 Ampere
1 DMM
1 6-lead Unipolar Stepper Motor (PH265M-33B or equivalent)
X Miscellaneous components
1 5804 Stepper motor translator/driver
1 TIP 120 NPN Darlington Transistor
1 Protoboard and connecting wire
X Power Supply and Multimeter user manuals or pdf files.
Lab 6: DC Series Motor
DC Series Motor
DC Generator
DC Power Supply
Dynamometer
(2) Multimeters
Connecting Cables
Tachometer
Lab 7: DC Compound Motor
DC Compound Motor
DC Generator
DC Power Supply
Dynamometer
(3) Multimeters
Connecting Cables
Tachometer

Lab 8: Single-Phase Capacitor Start AC Motor
Capacitor Start Motor
DC Generator
AC Power Supply
SPST Switch with high current capabilities
Dynamometer
(1) Multimeter
AC Clamp-on Ammeter
Connecting Cables
Tachometer
Lab 9: Squirrel Cage Induction Motor
Squirrel Cage Induction Motor
DC Generator
Dynamometer
3-Phase AC Power Supply Module (208V 3 F)
(4) AC Multimeters
Tachometer
Connection Leads
Lab 10: AC Variable Frequency Drives
AC Variable Frequency Drive
Human Interface Module (HMI)
Three-Phase Motor
DC Generator
Dynamometer
VFD Manual
N.O. Start Pushbutton
N.C. Stop Pushbutton
Selector Switch
Lab 11: Motor Starters
Panel box
Magnetic motor starter Module
Polyphase induction motor
AC power supply
N.O. and N.C. Pushbuttons
Line Fuses for Three phase power
Wires (#18 White, #18 Red)
Wire Labels with Number ID tags
Tie wraps

AMT 1071: Introduction to Basic Electricity
Lab 1: Electrical Safety
Computer and Internet access
Lab 2: Sources of Electricity
Computer and Internet access
Lab 3: Ohmmeter

(10) Carbon resistors
Analog Ohmmeter
Digital Ohmmeter
SPST Knife switch
Lab 4: Open and Closed Circuits
Stepdown Transformer (115/24Vac
Fuse, 1 amp, 120v
Single-pole, single-pole switch
1N4001 diode
1kΩ Resistor
Inductor, 1 Henry
Capacitor, 50ufd, 100 WVDC
Lamp, #53 (with socket)
Bread board with assorted connectors
Lab 5: Components and Schematic Symbols
Stepdown Transformer (115/24Vac
Fuse, 1 amp, 120v
Single-pole, single-pole switch
1N4001 diode
1kΩ Resistor
Inductor, 1 Henry
Capacitor, 50ufd, 100 WVDC
Lamp, #53 (with socket)
Bread board with assorted connectors
Lab 6: Voltage and Current Meter Measurements
Portable Digital Multimeter (Fluke 75 or equivalent)
1.5V D cell battery
1.2kΩ Resistor, ½ Watt
Breadboard and assorted leads
Lab 7: Ohm's Law
Digital Multimeter (DMM)
10kΩ Resistor, ½ Watt
1kΩ Resistor, ½ Watt
470Ω Resistor, ½ Watt
Breadboard and assorted leads
Lab 8: Watt's Law
DC Power Supply (0 to +10v)
Digital Multimeter (DMM)
100 Ω Resistor, 2 Watt
10kΩ Resistor, 10 Watt
Breadboard and assorted leads
Lab 9: Resistance in Series Circuits
Digital Multimeter (DMM)
10kΩ Resistor, ½ Watt
5.6kΩ Resistor, ½ Watt

1kΩ Resistor, ½ Watt
470Ω Resistor, ½ Watt
Breadboard and assorted leads
Lab 10: Current in Series Circuits
Digital Multimeter (DMM)
4.7kΩ Resistor, ½ Watt
1kΩ Resistor, ½ Watt
330Ω Resistor, ½ Watt
Breadboard and assorted leads
Lab 11: Voltages in Series Circuits
Digital Multimeter (DMM)
1kΩ Resistor, ½ Watt
470Ω Resistor, ½ Watt
330Ω Resistor, ½ Watt
100Ω Resistor, ½ Watt
Breadboard and assorted leads
Lab 12: Effects of an Open in Series Circuits
DC Power Supply
(2) Digital Multimeters
56kΩ Resistor, ½ Watt
12kΩ Resistor, ½ Watt
1kΩ Resistor, ½ Watt
Breadboard and assorted leads
Lab 13: Effects of a Short in Series Circuits
DC Power Supply
(2) Digital Multimeters
56kΩ Resistor, ½ Watt
12kΩ Resistor, ½ Watt
1kΩ Resistor, ½ Watt
Breadboard and assorted leads
Lab 14: Variable Resistors
Power Supply +6 DC volts
Digital Multimeter (DMM)
(2) #53 Lamps1
(2) #53 Lamp sockets
Variable Resistor 300Ω
Breadboard and assorted leads
Lab 15: Equivalent (Total) Resistance of a Parallel Circuit
DMM (Digital Multimeter)
Breadboard and assorted leads
2.2kΩ Resistor, ½ Watt
(3) 10kΩ Resistors, ½ Watt
22kΩ Resistor, ½ Watt
33kΩ Resistor, ½ Watt
100kΩ Resistor, ½ Watt

Lab 16: Voltage in Parallel Circuits
Digital multimeter (DMM)
Variable DC Power Supply
Breadboard and assorted leads
1kΩ Resistor, ½ Watt
2.2kΩ Resistor, ½ Watt
3.3kΩ Resistor, ½ Watt
4.7kΩ Resistor, ½ Watt
Lab 17: Current in Parallel Circuits
Digital Multimeter (DMM)
Variable DC Power Supply
1kΩ Resistor, ½ Watt
2.2kΩ Resistor, ½ Watt
3.3kΩ Resistor, ½ Watt
4.7kΩ Resistor, ½ Watt
Breadboard and assorted leads
Lab 18: Effects of an Open in Parallel Circuits
DC Power Supply
Digital Multimeter (DMM)
8.2kΩ Resistor, ½ Watt
12kΩ Resistor, ½ Watt
22kΩ Resistor, ½ Watt
Breadboard and assorted leads
Lab 19: AC Sine Wave Generation
1k Ω resistor
Digital Multimeter
Oscilloscope
Function Generator
Lab 20: Magnetism
DC power supply
Galvanometer or Micrometer
Heavy-duty horseshoe magnet
Bar Magnet
Magnetic compass
Conductance sheet metal (6 x 6 in.)
No. 18 iron nail
1 ft. of thin insulated wire
3 ft. of thin insulted wire
Iron filings
White poster board (12 x 12 in.)
Lab 21: Magnetism-Electromagnetism (Relay)
DC Relay with approximately 400 ohms coil resistance
#53 or equivalent lamp and socket (12.3 volt) light bulb
(2) DC power supplies 0v to 20 volt
Multimeter

Experiment Breadboard
Lab 22: Solid State Relays
Solid-State relay (Potter & Brumfield SSR-240D50 or equivalent)
120 Volt Isolated AC Power Supply
DC Power Supply 0 - 32volts
60 watt incandescent light bulb with socket
SPST Switch
2 amp fast-blow fuse
Oscilloscope
Multimeter
Miscellaneous connecting wires

AMT 1072: Instruments
Lab 1:Oscilloscope Voltage Measurements
Oscilloscope - Tektronix Model 2225 or equivalent
(2) 10X Probe
1X Probe
Sine-Square Wave (Function Generator) with leads
Low Voltage DC Power Supply and connecting leads
Breadboard
DMM - Digital Multimeter with connecting leads
(2) 1000 ohm resistors - 1/2 watt or larger
Lab 2: Oscilloscope Time Measurements
Oscilloscope - Tektronix Model 2225 or equivalent
(2) 10X Probe
1X Probe
Sine-Square Wave (Function Generator) with leads
Variable AC Power Supply
Breadboard
DMM - Digital Multimeter with connecting leads
(2) 1k ohm resistors - 1/2 watt or larger
1N4001 Diode
0.1 ufd Capacitor

AMT 1073: Components & Circuits
Lab 1: Basic Relay Ladder Circuits
Power Supply +24 DC Voltage
Relay with N.O. and N.C Contacts
Normally-Open Pushbutton
Normally-Closed Pushbutton
Green Lamp
Red Lamp
Lab 2: Installing Relays
120 Volt Isolated AC Power Supply
8-Pin Relay Socket

8-Pin Relay with two N.O. Contacts and one N.C. Contact
Normally-open Pushbutton
Normally-closed Pushbutton
Lamp
Miscellaneous Connecting Wires
Lab 3: Ladder Logic Design
+24 Volt DC Power Supply
50 Volt DC Power Supply
(2) Relay Coils with N.O. and N.C. Contacts
On-Delay Timer
Off-Delay Timer
(3) N.O. Pushbuttons
(2) N.C. Pushbuttons
3-Postion Selector Switch
24 Volt Lamp
Voltmeter
Connecting Wires
Ladder Logic Trainer Board or Construction Board
Lab 4: Time Delay Relays
120 Volt Isolated AC Power Supply
11-Pin Relay Socket
11-Pin Timing Relay with three N.O. Contacts and three N.C. Contacts
Normally-open Pushbutton
Lamp
Miscellaneous Connecting Wires
Lab 5: Overcurrent Protection Devices
Electric Motor or Nametag
Fuse Chart
Lab 6: Selecting Wire Sizes and Insulators
National Electrical Code (NEC) Charts 310.17 and 310.18
NEC 310.17 and 310.18 Correction Factor Charts
Wire Insulation Chart

AMT 1074: Solid State Devices
Lab 1: Semiconductor Diodes
DC Power Supply
(2) Ammeters
Voltmeter
1N4001 Standard Diode
1N960 Zener Diode (9.1v)
10kΩ Resistor
4.7kΩ Resistor
2.2kΩ Resistor
1kΩ Resistor
500Ω Resistor

(2)100Ω Resistors
Connecting Cables
Lab 2: Zener Diode Regulation
Power Supply 0 to 10vDC
Multimeter
Zener Diode 5.1v
Resistor 4.7kΩ
Resistor 330Ω
Resistor 100Ω
Breadboard and Assorted Connectors
Lab 3: Rectifiers and Filtering
Oscilloscope
120 Volt AC Power Source
24 Volt Center-Tapped Transformer
(4) 1N4001 Diodes
10kΩ Resistor 0.5 Watt
10 µfd Capacitor
470 µfd Capacitor
Connecting Cables
Lab 4: DC Power Supply
120 Volt AC Power Supply
Step Down Transformer 120/24
(4) 1N4001 Diodes
47ufd Capacitor
10kΩ Resistor (0.5w)
Oscilloscope
Breadboard
Lab 5: Bipolar Transistor
Signal Generator
DC Power Supply
Analog Ohmmeter
Digital Multimeter
Oscilloscope
SPDT Switch
2N2222 NPN Transistor
100kΩ Resistor
22kΩ Resistor
2.2kΩ Resistor
220Ω Resistor
220 ufd Capacitor
(2) ufd Capacitors
Connecting Cables
Lab 6: Unijunction Transistor (UJT)
+12VDC Power Supply
(2) Multimeters
2N2646 UJT

10kΩ Potentiometer
1kΩ Resistor
(2) 100Ω Resistors
Lab 7: Thyristors
100 Volt Peak to-Peak AC Power Supply
50 Volt DC Power Supply
12 Volt Dual DC Power Supply
Oscilloscope
(2) Voltmeters
Diac 40 Volt VBO
Triac ECG5640
10kΩ Potentiometer
10kΩ Resistor
(2) 1kΩ Resistors
470Ω Resistor
#53 Lamp with Base
SPST Switch
SP-Three Position Switch
Lab 8: Silicon Controlled Rectifier (SCR)
DC Power Supply
Multimeter
SCR S4006L (or Equivalent)
#53 Lamp
680Ω Resistor
10kΩ Resistor
SPST Switch
DPST Switch
Lab 9: Logic AND Gate IC
+5 Volt DC Power Supply
7408 Integrated Circuit
14-Pin IC Socket
(2) SPDT Switches
Multimeter
Experiment Breadboard

AMT 1081: Basic Mechanical Power Transmission
NO LABS

AMT 1082: Flexible Drives
Lab 1: Belt Drive System Identification, Visual Inspection, & Lockout/Tagout/Blockout
Belt sample set
Assorted pulleys and sheaves
Sheave inspection gauge set
DAC Belt Drive Trainer 201 (or equivalent)

Lab 2: Run-Out
Combination wrench set
Adjustable wrench
Hex wrench set
Magnetic base/dial indicator set
File
Pencil and paper
A piece of chalk
Horizontal shaft precision bearing balancer
DAC Belt Drive Trainer 201 (or equivalent)
Lab 3: Pulley Fit to Shaft, Set Screws & Keys, and Pulley Wear
Combination wrench set
Screw driver set
Hex wrench set
Sheave/bearing puller
Torque wrench (optional)
Sheaves and sheave bushings
DAC Belt Drive Trainer 201 (or equivalent)
Lab 4: Belt or Drive Unit Replacement
Combination wrench set
Adjustable wrench
Hex wrench set
File
Pencil and paper
A piece of chalk
A variety of v-belts
DAC Belt Drive Trainer 201 (or equivalent)
Lab 5: Take-up Equipment Function
Combination wrench set
Adjustable wrench
Hex wrench set
File
Pencil and paper
DAC Belt Drive Trainer 201 (or equivalent)
Lab 6: Alignment and Belt Tension
Combination wrench set
Hex wrench set
Belt tensioning gauge (i.e. Gates belt tension gauge)
6" rule
Straightedge
Length of string
Soft-faced mallet
Pencil and paper
Piece of chalk
Tape measure
Two fractional horsepower sheaves ("L" belt size)

Correct size fractional horsepower belt (2L, 3L, etc.)
V-belt Laser Alignment System
DAC Belt Drive Trainer 201 (or equivalent)
Lab 7: Chain Drive System Identification, Visual Inspection, and Lockout/Tagout/Blockout
Chain sample set
Assorted sprockets
AMTEC Integrated Manufacturing Simulator or equivalent
Lab 8: Inspection of Excessive Roller Chain Wear and Run-out of the Sprockets
Combination wrench set
Screw driver set
Hex wrench set
Sprocket/bearing puller
Torque wrench (optional)
DAC Belt Drive Trainer 201 (or equivalent)
Lab 9: Alignment and Chain Tension
Combination wrench set
Hex wrench set
Chain puller
6" rule
Straightedge
Length of string
Soft-faced mallet
Pencil and paper
Piece of chalk
Tape measure
Two #40 roller chain sprockets
A significant length of #40 roller chain
DAC Belt Drive Trainer 201 (or equivalent)
Lab 10: Sprocket Fit to Shaft, Set Screws & Keys, and Sprocket Wear
Combination wrench set
Screw driver set
Hex wrench set
Sprocket/bearing puller
Torque wrench (optional)
AMTEC Integrated Manufacturing Simulator (or equivalent)
Sample chain drive sprockets
Lab 11: Take-up Equipment Function (Chain Drives)
Combination wrench set
Adjustable wrench
Hex wrench set
File
Pencil and paper
DAC Belt Drive Trainer 201 (or equivalent)
Lab 12: Chain or Drive Unit Replacement

Combination wrench set
Adjustable wrench
Hex wrench set
File
Pencil and paper
Piece of chalk
Sufficient length of roller chain
DAC Belt Drive Trainer 201 (or equivalent)

AMT 1083: Couplings & Alignment
Lab 1: Lockout, Tagout, Blockout, Coupling Identification, and Visual Inspection
Power supply that may be locked out
Power transmission simulator (or motor - pump/gearbox assembly)
Various coupling assemblies (some damaged, if possible)
Lab 2: Coupling Fit to Shaft, Set Screws & Keys, and Coupling Wear
Power transmission simulator (or motor – pump/gearbox assembly)
Various couplings (some damaged, if possible)
Shafts and keys
Lab 3: Installation and Assembly of a Rigid Coupling
Power transmission simulator (or motor – pump/gearbox assembly) with the shafts aligned
Rigid coupling
Lab 4: Installation and Assembly of a Flexible Coupling
Power transmission simulator (or motor – pump/gearbox assembly) with the shafts aligned
Flexible coupling
Lab 5: Shaft Alignment by Either Rough Alignment or Rim & Face Method
Power transmission simulator (or motor – pump/gearbox assembly) with a mounted coupling assembly
Lab 6: Shaft Alignment by Either the Reverse Dial or Laser Method
Power transmission simulator (or motor – pump/gearbox assembly) with a mounted coupling assembly

AMT 1084: Bearings, Shafts, & Seals
Lab 1: Lockout, Tagout, Blockout
AMTEC Integrated Manufacturing Simulator or training equipment with various energy sources and lockout, tagout, blockout devices
Lab 2: Seal Identification, Installation, Lubrication, & Troubleshooting
Various Shafts
Seals
Hand Tools (needed to install, remove, and inspect the seals)
Lab 3: Shaft Identification, Selection, Inspection, & Troubleshooting
Various Shafts
Measuring Instruments
Hand Tools
Lab 4: Plain Bearing Identification, Installation, Lubrication, & Troubleshooting
Various plain bearings

Measuring instruments
Hand tools (needed to identify and inspect plain bearings)
Lab 5: Roller Bearing Identification, Installation, Lubrication, & Troubleshooting
Various rolling element bearings
Measuring instruments
Hand tools (Needed to identify and inspect roller bearings.)
Lab 6: Bearing Installation and Removal with a Hammer and a Mandrel
Various bearings
Mounted bearings
Hand tools (Needed to install and remove bearing with hammer and mandrel.)
Lab 7: Bearing Installation and Removal with an Arbor Press
Various bearings
Mounted bearings
Hand tools (Needed to install and remove bearing with arbor press.)
Lab 8: Bearing Installation with an Induction Heater
Various bearings
Mounted bearings
Hand tools (Needed to install and remove bearing with induction heater.)

AMT 1085: Brakes & Clutches
Lab 1: Clutch and Brake Identification, Visual Inspection, and Lockout, Tagout, and Blockout
Power transmission simulator (or motor - brake/clutch assembly) with various brake/clutch assemblies
Lab 2: Disassembly, Friction Pad/Brake Shoe Replacement, and Inspection of a Brake/Clutch Unit
Power transmission simulator (or motor - brake/clutch assembly) with various brake/clutch assemblies
Lab 3: Installation of a Clutch/Brake Assembly
Power transmission simulator (or motor - brake/clutch assembly) with various brake/clutch assemblies

AMT 1086: Gears & Cams
Lab 1: Gear Identification, Common Terms, Shaft Orientation, and Visual Inspection
Power transmission simulator (or motor – gearbox assembly)
Various gear sets (some damaged, if possible)
Lab 2: Assembly of a Parallel Shaft Gear Drive and Checking Backlash
Power transmission simulator (or motor – gearbox assembly) or a parallel shaft gearbox
Component to perform the proper lockout, tagout, and blockout
Lab 3: Assembly of an Angled Shaft Gear Drive
Power transmission simulator (or motor – gearbox assembly) or an angled shaft gearbox
Component to perform the proper lockout, tagout, and blockout
Lab 4: Assembly of a Worm and Wheel Gearbox Drive Unit
Power transmission simulator (or motor – gearbox assembly) or an worm and wheel gearbox drive unit

Component to perform the proper lockout, tagout, and blockout

AMT 1091: Basic OSHA Safety
Lab 1: Lockout, Tagout, Blockout
AMTEC Manufacturing System Simulator (or equivalent)
Lockout, Tagout, Blockout Devices

AMT 1092: Hoists & Cranes
NO LABS

AMT 1093: Rigging Awareness & Fundamentals
Lab 1: Develop a Rigging Plan
Area that will allow a load to be lifted, moved, and/or rotated
Lab 2: Measure Item to be Rigged, Identify Material, and Calculate Weight
Assigned object to be lifted
Tape measure
Calculator,
Materials weight chart (i.e. pg. 420, Industrials Mechanics, Albert W. Kemp, 2nd edition)
Lab 3: Center of Gravity
Assigned object to be lifted
Tape measure
Calculator
Lab 4: Identify and Select the Correct Type of Hitch and Slings (Fiber and Wire), Straps, and/or Chains
Assigned object to be lifted
Calculator
Lab 5: Identify and Select Proper Rigging Equipment and Hardware
Assigned object to be lifted
Rigging Hardware
Lab 6: Rig Various Items with the Four Basic Hitches
Assigned object to be lifted
Various slings and rigging hardware
Lab 7: Turn a Load
Assigned object to be lifted
Various slings and rigging hardware

AMT 1094: Basic First Aid, CPR, & AED (Course Temporarily Unavailable)
http://autoworkforce.org/curriculum-resources/instructor-resources/redcross/

AMT 1101: Introduction to Arc Welding
No Labs

AMT 1102: SMAW/Stick Welding
Lab 1: Strike an Arc Using Scratch Method and Tap Method

Single/Multiple Process Constant Current Power Source
Mild Steel Plate 3/16" or thicker
E6010 electrode
Lab 2: Run a Straight Bead on a Flat Plate and Fill the Crater
Single/Multiple Process Constant Current Power Source
Mild Steel Plate 3/16" or thicker
E6013 electrode
Lab 3: Run a Bead with a Whipping Technique
Single/Multiple Process Constant Current Power Source
Mild Steel Plate 3/16" or thicker
E6013 electrode
Lab 4: Building a Pad
Single/Multiple Process - Constant Current Power Source
Mild Steel Plate 3/16" or thicker
1/8" (E6013)
Lab 5: Horizontal Welding Process/Lap Weld/Whip
Single/Multiple Process - Constant Current Power Source
Mild Steel Plate 3/16" or thicker
1/8" (E6013)
Lab 6: Horizontal Process/Fillet Weld
Single/Multiple Process - Constant Current Power Source
Mild Steel Plate 3/16" or thicker
1/8" (E6013)
Lab 7: Horizontal Process/Fillet Weld E7018 Electrode
Single/Multiple Process - Constant Current Power Source
Mild Steel Plate - 10 gauge
1/8" (E7018) for DC
Lab 8: Three Pass Horizontal Process
Single/Multiple Process - Constant Current Power Source
Mild Steel Plate - 10 gauge
1/8" (E7018) for DC
Lab 9: Vertical Down Process
Single/Multiple Process - Constant Current Power Source
Mild Steel Plate - 10 gauge
1/8" E6013
Lab 10: Vertical Down Process with E6010
Single/Multiple Process - Constant Current Power Source
Mild Steel Plate - 10 gauge
1/8" E6010
Lab 11: Lap Joint Overhead Process
Single/Multiple Process - Constant Current Power Source
Mild Steel Plate - 10 gauge
1/8" (E6010) for DC
Lab 12: Tee Joint in Overhead Position
Single/Multiple Process - Constant Current Power Source

Mild Steel Plate - 10 gauge
1/8" (E6010) for DC
Lab 13: Single Pass Weld on a Tee Joint in Vertical Position
Single/Multiple Process - Constant Current Power Source
Mild Steel Plate - 1/4"
1/8" (E6010)
Lab 14: Three Pass Vertical Up Process Tee
Single/Multiple Process - Constant Current Power Source
Mild Steel Plate - 10 gauge
1/8" (E7018) for DC
Lab 15: Vertical Up Process Tee Triangular
Single/Multiple Process - Constant Current Power Source
Mild Steel Plate - 1/4"
1/8" (E7018)
Lab 16: Three Pass Fillet Weld on a Tee Joint in the Vertical Position Welding Up with an E7018 Electrode
Single/Multiple Process - Constant Current Power Source
Mild Steel Plate - 1/4"
1/8" (E7A1:A66

AMT 1103: GMAW Welding
Lab 1: Run a Stringer Bead/Build a Pad
Single (or Multi-process) Process - Constant Voltage Power Source & Wire Feeder
Mild Steel Plate - 3/16"
0.035" (ER70S-6)
100% CO2 or 75% Ar/ 25% CO2 blend shielding gas
Lab 2: Fillet Weld on a Lap Joint Vertical Position
Single (or Multi-process) Process - Constant Voltage Power Source & Wire Feeder
Mild Steel Plate - 10 gauge
0.035" (ER70S-6)
100% CO2 or 75% Ar/ 25% CO2 blend shielding gas
Lab 3: Fillet Weld on Tee Joint Horizontal Position
Single (or Multi-process) Process - Constant Voltage Power Source & Wire Feeder
Mild Steel Plate - 10 gauge
0.035" (ER70S-6)
100% CO2 or 75% Ar/ 25% CO2 blend shielding gas
Lab 4: Fillet Weld on a Lap Joint Using Short Arc Process Vertical Position Welding Down
Single (or Multi-process) Process - Constant Voltage Power Source & Wire Feeder
Mild Steel Plate - 10 gauge
0.035" (ER70S-6)
100% CO2 or 75% Ar/ 25% CO2 blend shielding gas
Lab 5: Fillet Weld on a Lap Joint Using Short Arc Process Vertical Position Welding Down
Single (or Multi-process) Process - Constant Voltage Power Source & Wire Feeder

Mild Steel Plate - 10 gauge
0.035" (ER70S-6)
100% CO2 or 75% Ar/ 25% CO2 blend shielding gas
Lab 6: Square Weld on a Butt Joint
Single (or Multi-process) Process - Constant Voltage Power Source & Wire Feeder
Mild Steel Plate - 10 gauge
0.035" (ER70S-6)
100% CO2 or 75% Ar/ 25% CO2 blend shielding gas
Lab 7: Fillet Weld on a Tee Joint Using Short Arc Transfer in the Overhead Position
Single (or Multi-process) Process - Constant Voltage Power Source & Wire Feeder
Mild Steel Plate - 10 gauge
0.035" (ER70S-6)
100% CO2 or 75% Ar/ 25% CO2 blend shielding gas
Lab 8: Three Pass Fillet Weld on a Tee Joint in the Horizontal Position
Single (or Multi-process) Process - Constant Voltage Power Source & Wire Feeder
Mild Steel Plate - 1/4"
0.035" (ER70S-6)
100% CO2 or 75% Ar/ 25% CO2 blend shielding gas
Lab 9: Horizontal Fillet Weld on a Tee Joint Using Axial Spray Transfer
Single (or Multi-process) Process - Constant Voltage Power Source & Wire Feeder
Mild Steel Plate - ¼ "
0. 045" (ER70S-6)
90% Ar 10% CO2 blend shielding gas

AMT 1104: Oxy/Fuel Cutting & Joining
Lab 1: Oxy/Fuel Part Identification
Standard Oxy-Fuel Welding Set-up (regulators, handle, mixer, tip, hose, check valves, flashback arrestors & cylinder cart)
Oxygen & Acetylene Gases
Flint Lighter
Lab 2: Running a Bead
Standard Oxy-Fuel Welding Set-up (regulators, handle, mixer, tip, hose, check valves, flashback arrestors & cylinder cart)
PPE
Oxygen & Acetylene Gases
Flint Lighter
12" x 12" - 1/8" mild steel coupon
Welding Rod R60 or R45
Lab 3: Butt Joint Weld in the Flat Position
Standard Oxy-Fuel Welding Set-up (regulators, handle, mixer, tip, hose, check valves, flashback arrestors & cylinder cart),
PPE
Oxygen & Acetylene Gases
Flint Lighter
2 - 6" x 6" - 1/8" mild steel coupon

1/8" Welding Rod R60 or R45
Vise
Hammer
Lab 4: Fillet Weld the Lap Joint in a Horizontal Position
Standard Oxy-Fuel Welding Set-up (regulators, handle, mixer, tip, hose, check valves, flashback arrestors & cylinder cart),
PPE
Oxygen & Acetylene Gases
Flint Lighter
2 - 6" x 6" - 1/8" mild steel coupon
1/8" Welding Rod R45
Vise
Hammer
Lab 5: Fillet Weld on a Tee Joint in the Horizontal Position
Standard Oxy-Fuel Welding Set-up (regulators, handle, mixer, tip, hose, check valves, flashback arrestors & cylinder cart)
PPE
Oxygen & Acetylene Gases
Flint Lighter
1 - 6" x 6" - 1/8" mild steel coupon
1 – 3" x 6" – 1/8" mild steel coupon
1/8" R45 welding rod
Vise
Hammer
Lab 6: Fillet Weld in the Vertical Position Welding Down
Standard Oxy-Fuel Welding Set-up (regulators, handle, mixer, tip, hose, check valves, flashback arrestors & cylinder cart)
PPE
Oxygen & Acetylene Gases
Flint lighter
2 - 6" x 6" - 1/8" mild steel coupon
1/8" R45 welding rod
Vertical Stand (to hold the work pieces in position)
Vise
Hammer
Lab 7: Brazing
Standard Oxy-Fuel Welding Set-up (regulators, handle, mixer, tip, hose, check valves, flashback arrestors & cylinder cart)
PPE
Oxygen & Acetylene Gases
Flint lighter
12' x 12' - 1/8 mild steel coupon
Brazing Rod and Brazing Flux
1/8' Vertical Stand (to hold the work pieces in position)
Lab 8: Braze Weld a Butt Joint

Standard Oxy-Fuel Welding Set-up (regulators, handle, mixer, brazing tip, hose, check valves, flashback arrestors & cylinder cart)
PPE
Oxygen & Acetylene gases
Flint lighter
Wire brush/emery cloth
2 - 6" x 6" - 1/8 mild steel coupon
1/8" brazing rod and brazing flux
Lab 9: Braze a Lap Joint in Horizontal Position
Standard Oxy-Fuel Welding Set-up (regulators, handle, mixer, brazing tip, hose, check valves, flashback arrestors & cylinder cart)
PPE
Oxygen & Acetylene gases
Flint lighter
Wire brush/emery cloth
2 - 6" x 6" - 1/8 mild steel coupon
1/8" brazing rod
Brazing flux
Lab 10: Hand Held Cut
Standard Oxy-Fuel Cutting Set-up(regulators, handle, cutting attachment, tip, hose, check valves, flashback arrestors & cylinder cart)
Oxygen & acetylene gases
Flint lighter
PPE
2" x 12" - 1/2" thick mild steel
Lab 11: Cut a Bevel Angle
Oxy-Fuel Cutting Set-up(regulators, handle, cutting attachment, tip, hose, check valves, flashback arrestors & cylinder cart)
Oxygen & acetylene gases
Flint lighter
PPE
12" long 2" x 2" angle iron
12" x 12" - 1/2" thick mild steel
Lab 12: Pierce a Hole
Oxy-Fuel Cutting Set-up (regulators, handle, cutting attachment, tip, hose, check valves, flashback arrestors & cylinder cart)
Oxygen & acetylene gases
Flint lighter
PPE
6" x 6" - 1/2" thick mild steel
Lab 13: Cut a Straight Line in Light Steel
Oxy-Fuel Cutting Set-up (regulators, handle, cutting attachment, tip, hose, check valves, flashback arrestors & cylinder cart)
Oxygen & acetylene gases
Flint lighter
PPE

6" x 6" - 1/8" thick mild steel

AMT 1201: Introduction to Machining Operations
No Labs

AMT 1202: Turning
Lab 1: Turn #1
Engine Lathe
Journal
Lab 2: Turn #2
Engine Lathe
Journal
Lab 3: Turn #3
Engine Lathe
Journal
Drill bit
Tap Set
Countersink
Reamer

AMT 1203: Milling
Lab 1: Mill #1
Vertical Milling Machine
Blank
Lab 2: Mill #2
Vertical Milling Machine
Blank
Lab 3: Mill #3
Vertical Milling Machine
Blank
Drill bits
Tap Set
Countersink
Reamer

AMT 1204: Drill Press
Lab 1: Drill Press #1
Drill Press
Drill Bit Set
Countersink
Lab 2: Drill Press #2
Drill Press
Drill Bit Set
Reamer
Lab 3: Drill Press #3

Drill Press
Drill Bit Set
Countersink
Reamer

AMT 1205: Saws
Lab 1: Saw #1
Horizontal Band Saw
1/2" X 3" Rectangular Bar
Lab 2: Saw #2
Horizontal Band Saw
1/2" X 3" Rectangular Bar
Lab 3: Saw #3
Horizontal Band Saw
Ø 1-1/2" Round Bar
Lab 4: Saw #4
Horizontal Band Saw
Ø 1-1/2" Round Bar
Lab 5: Saw #5
Horizontal Band Saw
Ø 1-1/2" Round Bar
Lab 6: Saw #6
Horizontal Band Saw
Ø 1-1/2" Round Bar
Lab 7: Saw #7
Horizontal Band saw
1/2" X 3" Square Bar

AMT 1206: Hand and Power Tools
Lab 1: Hand Tool #1
Layout tools
File
Grinder
1" x 3" x 5" Cold-Rolled Steel
Lab 2: Hand Tool #2
Layout tools
Drill Press
Drill Bits
Reamer
Taps
1" x 3" x 5" Cold-Rolled Steel
Note: Use same piece from Lab 1: Hand Tool #1.
Lab 3: Hand Tool #3
Layout tools
Hand Tools

(4) 1/4" Roll Pins
(1) 5/16" Socket Head Cap Screw
(1) 5/16" Pan Cross Head Screw
(1) 3/8" Hex Head Screw
1" x 3" x 5" Cold-Rolled Steel
Note: Use same piece from Lab 2: Hand Tool #2.
Lab 4: Saw #4
Layout tools
File
Grinder
Tap and Die Set
1/2" x 3" Cold-Rolled Steel

AMT 1207: Measuring and Layout Tools
Lab 1: Measurement #1
Steel rule
Gage block builds
Lab 2: Measurement #2
Steel rule
Micrometer
Vernier Calipers
Socket Heads
Shoulder Bolts
Lab 3: Measurement #3
Steel rule
Micrometer
Vernier Calipers
Gage Blocks
Lab 4: Measurement #4
Micrometer
Gage Pins
Lab 5: Measurement #5
Height Gage
Gage Blocks
Lab 6: Measurement #6
Height Gage
Gage Blocks
Lab 7: Layout #1
Layout Tools
3" x 6" x 1/4" Cold Rolled Steel Stock
Lab 8: Layout #2
Layout Tools
1.97 x 3.00 x .47 Cold Rolled Steel Stock