

METALFORM

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PMA PRECISION
METALFORMING
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COURSE CATALOG

PMA PRECISION
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Shape the next generation of skilled workers with METALFORM EDU—a one-stop shop for all of your training needs, on one easy-to-access site available any time and any place. No need to worry about teaching or sending employees offsite. We have everything you need online, with more than 550 courses in our continuously growing library. With multiple purchasing options, and courses organized into categories, as well as career learning paths, training your employees has never been easier.

RECOMMENDED LEARNING PATHS

PMA's METALFORM EDU catalog includes 27 recommended learning paths focused on specific functional roles and/or content areas in a manufacturing environment. The catalog includes recommendations for both required and elective courses per learning path that you can assign your users, depending on your company's needs, and employee prior experience and skills.

NEW HIRE ONBOARDING

Description

Currently taking your best employees off the floor to train new hires on the same topics week-after-week - Safety, OSHA, communication skills and more? PMA's Onboarding learning path provides all that you will need at a fraction of your current training costs, when you consider time-off-of-job for HR, veteran employees and more. This learning path includes critical content on Safety, Precision Measurement Tools, Introduction to Metal Stamping, Quality and more. All courses in the learning path are configured as elective, to enable you to identify the specific onboarding requirements for your company.

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- MEA-2001 Precision Measurement Tools - Introduction to Precision Instruments
- MEA-2003 Precision Measurement Tools - Calipers
- MEA-2004 Precision Measurement Tools - Micrometers
- MEA-2012 Precision Measurement Tools - Attribute Gauges
- QUA-1001 Quality Systems - Introduction to Quality
- QUA-1002 Quality Systems - ISO 9000
- QUA-1003 Quality Systems - Standards Organizations
- QUA-1004 Quality Systems - Quality Organizations
- QUA-1005 Quality Systems - Basic Quality Roles and Responsibilities
- SAF-1001 Introduction to Safety - Introduction to OSHA
- SAF-1002 Introduction to Safety - Making Work a Safer Place
- SAF-1003 Help! What to Do in an Emergency
- SAF-1004 Personal Protective Equipment Safety - Personal Protective Equipment
- SAF-1005 Personal Protective Equipment Safety - Eye and Face Protection
- SAF-1021 Lockout/Tagout
- PMA-1001 Introduction to Metal Stamping
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills

WORKPLACE SAFETY

Description

Using multiple resources now to train your staff on safety? Find it all in a single location with PMA's Workplace Safety learning path. This robust offering includes some 33 safety-focused courses, including safe work practices, personal protective equipment, emergency preparedness, OSHA compliant and more. All courses in the learning path are configured as elective, to enable you to set the specific safety training requirements for your company.

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- SAF-1001 Introduction to OSHA
- SAF-1002 Making Work a Safer Place
- SAF-1003 Help! What to Do in an Emergency
- SAF-1004 Personal Protective Equipment
- SAF-1005 Eye and Face Protection
- SAF-1006 Head Protection
- SAF-1007 Foot and Leg Protection
- SAF-1008 Hand and Arm Protection
- SAF-1009 Body Protection
- SAF-1010 Hearing Protection
- SAF-1011 Respiratory Protection
- SAF-1012 Hazardous Materials
- SAF-1013 HazCom
- SAF-1014 Hazardous Waste
- SAF-1015 Hazard Material Storage
- SAF-1016 Work Area Safety
- SAF-1017 Permit-Related Safety
- SAF-1018 Fall Prevention
- SAF-1019 Ladder Safety
- SAF-1020 Electrical Safety
- SAF-1021 Lockout/Tagout
- SAF-1022 Fire Safety
- SAF-1023 Fire Extinguishers

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- SAF-1025 Powered Industrial Trucks
- SAF-1026 Crane and Rigging Safety
- SAF-1027 Hand Tool Safety
- SAF-1028 Power Tool Safety
- SAF-1029 Sheet Metal and Compressed Gas Safety
- SAF-1030 Machine Safety
- SAF-1031 Safety Devices

CORE MATH SKILLS FOR MANUFACTURING

Description

Do you have employees who lack core math skills required for the job? The PMA Core Math Skills for Manufacturing learning path includes content in basic arithmetic including Introduction to Basic Math, Arithmetic Operations, Numbers and the Number Line, Working with Fractions, Decimal Numbers, and Positive and Negative Numbers. All courses in the learning path are configured as elective, to enable you to set the specific math requirements for each employee.

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- MTH-1001 Basic Math - Introduction to Basic Math
- MTH-1002 Basic Math - Arithmetic Operations
- MTH-1003 Basic Math - Numbers and the Number Line
- MTH-1004 Fractions - Introduction to Fractions
- MTH-1005 Fractions - Working with Fractions
- MTH-1006 Decimals - Decimal Numbers
- MTH-1007 Positive and Negative Numbers - Positive and Negative Numbers
- MTH-1009 The Metric System - The Metric System

CORE MEASUREMENT SKILLS FOR MANUFACTURING

Description

Find that your new hires have never been exposed to basic precision measurement devices, such as micrometers, dial indicator and calipers? Do your experienced employees need to brush up on advanced precision measurement tools? PMA's affordable Core Measurement Skills for Manufacturing content library provides more than 26 courses on virtually all measurement devices used in a manufacturing environment. All courses in the learning path are configured as elective, to enable you to set the specific quality requirements for your organization.

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- MEA-2001 Precision Measurement Tools - Introduction to Precision Instruments
- MEA-2002 Precision Measurement Tools - Rules
- MEA-2003 Precision Measurement Tools - Calipers
- MEA-2004 Precision Measurement Tools - Micrometers
- MEA-2005 Precision Measurement Tools - Small Hole Gauges
- MEA-2006 Precision Measurement Tools - Dial Indicators
- MEA-2008 Precision Measurement Tools - Height Gauges
- MEA-2007 Precision Measurement Tools - Bore Gauges
- MEA-2009 Precision Measurement Tools - Go/NoGo Gauges
- MEA-2010 Precision Measurement Tools - Test Indicators
- MEA-2011 Precision Measurement Tools - Go/NoGo Thread Gauges
- MEA-2012 Precision Measurement Tools - Attribute Gauges
- MEA-2013 Precision Measurement Tools - Thickness and Radius Gauges
- MEA-2014 Precision Measurement Tools - Squares and Protractors
- MEA-2015 Precision Measurement Tools - Surface Roughness Comparators
- MEA-2016 Precision Measurement Tools - Adjustable Parallels
- MEA-2017 Precision Measurement Tools - Surface Plates
- MEA-2018 Precision Measurement Tools - Optical Comparators
- MEA-2019 Precision Measurement Tools - Optical Center Finders
- MEA-2020 Fastener Inspection Gauges - Grip Gauges
- MEA-2021 Fastener Inspection Gauges - Countersink Gauges
- MEA-2022 Fastener Inspection Gauges - Fastener Height
- MEA-2023 Fastener Inspection Gauges - Rivet Inspection
- MEA-2024 Fastener Inspection Gauges - Fastener Inspection
- MEA-2025 Fastener Inspection Gauges - Gap Inspection Gauges
- MEA-2026 Weld Gauges - Weld Gauges

GEOMETRIC DIMENSIONING & TOLERANCING (GD&T)

Description

PMA's Geometric Dimensioning and Tolerancing library includes some 11 courses, starting with the basics of terms and symbols and datums, moving on to more complex topics such as orientation, location and runout tolerances. All courses in the learning path are configured as elective, to enable you to set the specific GD&T requirements for each employee.

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- DWG-3001 Geometric Dimensioning and Tolerancing - Introduction to GD&T
- DWG-3002 Geometric Dimensioning and Tolerancing - GD&T Terms and Symbols
- DWG-3003 Geometric Dimensioning and Tolerancing - Rules of GD&T
- DWG-3004 Geometric Dimensioning and Tolerancing - Geometric Tolerances
- DWG-3005 Geometric Dimensioning and Tolerancing - Datums
- DWG-3006 Geometric Dimensioning and Tolerancing - Form Tolerances
- DWG-3007 Geometric Dimensioning and Tolerancing - Profile Tolerances
- DWG-3008 Geometric Dimensioning and Tolerancing - Orientation Tolerances
- DWG-3009 Geometric Dimensioning and Tolerancing - Runout Tolerances
- DWG-3010 Geometric Dimensioning and Tolerancing - Location Tolerances

STATISTICAL PROCESS CONTROL

Description

Statistical process control (SPC) procedures help you monitor process behavior. One of the staple SPC tools used by quality process technicians, testers and inspectors is the control chart. PMA's SPC learning path includes content probability and variation; control charts; problem solving and more.

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- QUA-1011 Introduction to Statistical Process Control - Introduction to SPC
- QUA-1012 Introduction to Statistical Process Control - Probability and Variation
- QUA-1013 Introduction to Statistical Process Control - The Control Chart
- QUA-2001 Advanced Statistical Process Control - Control Chart Analysis
- QUA-2002 Advanced Statistical Process Control - Process Capability
- QUA-2003 Advanced Statistical Process Control - Problem Solving Tools
- QUA-2004 Advanced Statistical Process Control - Problem Solving

OCCUPATIONAL APTITUDE

Description

Working with local high schools and vocational skills to build a pathway into regional careers in manufacturing? PMA's Occupational Aptitude Library includes a number of courses that prepares learners to take PMA's Occupational Aptitude and Knowledge Assessment. This library can also be used to provide remediation for existing employees who took the assessment but need some extra help before re-taking it. All courses in the learning path are configured as elective, to enable you to assign content as appropriate based on the Occupational Aptitude and Knowledge Assessment results and/or identified needs for each employee.

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- DWG-1001 Blueprint Reading Fundamentals - Introduction to Blueprints
- DWG-1003 Engineering Drawing Views
- DWG-1004 Engineering Drawing Lines
- DWG-1005 Dimensions and Tolerances
- MTH-1002 Basic Math - Arithmetic Operations
- MTH-1003 Numbers and the Number Line
- MTH-1006 Decimal Numbers
- MTH-1008 Cartesian Coordinates
- MEA-2002 Rules
- MEA-2014 Squares and Protractors
- MTH-1021 Time
- SAF-1001 Introduction to Safety - Introduction to OSHA

SUPERVISORY SKILLS

Description

Leader, manager, supervisor, team leader -- no matter the official title, supervisors are expected to get the job done through others. Management success depends upon a supervisor's abilities as a coach, team builder, time and project manager, and employee motivator and disciplinarian. The job-within-the-job often expands to include highly finessed communication skills, resolving conflicts, problem solving, decision making, and more. For employees who have been leading and managing for years, as well as those being groomed for a future supervisory role, PMA's Supervisory Skills learning path provides the courses they'll need for management success.

Mandatory Courses

- COM-1001 Interpersonal Communications - Introduction to Communication
- COM-1002 Interpersonal Communications - Effective Communication
- COM-1003 Interpersonal Communications - Verbal Communication
- COM-1004 Interpersonal Communications - Written Communication
- COM-1005 Interpersonal Communications - Nonverbal Communication
- COM-1006 Interpersonal Communications - Listening Skills
- COM-1007 Interpersonal Communications - Workplace Communication
- COM-2001 Conflict Resolution - Understanding Conflict
- COM-2002 Conflict Resolution - Communication Skills
- COM-2003 Conflict Resolution - Managing Conflict
- COM-2005 Technical Writing - Successful Documentation
- TEA-1001 Group Dynamics - Working in a Group
- TEA-1002 Group Dynamics - Group Communication
- TEA-1003 Group Dynamics - Effective Collaboration
- TEA-1004 Group Dynamics - Life Stages of a Team
- TEA-1005 Group Dynamics - Meetings
- TEA-1006 Group Dynamics - Diversity
- TEA-1007 Group Dynamics - Creativity
- TEA-1008 Group Dynamics - Problem Solving
- TEA-1009 Group Dynamics - Decision Making
- TEA-1010 Group Dynamics - Conflict Management
- TEA-1011 Leadership
- TEA-1012 Group Dynamics - Virtual Groups
- TIM-1001 Managing Your Time
- TIM-1009 When Time Gets the Best of You: Dealing with Stress

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- COM-2004 Technical Writing - Introduction to Technical Writing
- MFG-1006 Measuring Success in Manufacturing
- MSO-1001 Microsoft Excel - Getting Started with Excel
- MSO-1002 Microsoft Excel - Entering Text and Values
- MSO-1003 Microsoft Excel - Formatting Data
- MSO-1004 Microsoft Excel - Formulas and Functions
- MSO-1005 Microsoft Excel - Working with Dates and Times
- MSO-1006 Microsoft Excel - Working with Data Tables
- MSO-1007 Microsoft Excel - Displaying Data in Charts
- MSO-1008 Microsoft Excel - Printing a Worksheet

PRESS TECHNICIAN LEARNING PATHS

Description

The Press Technician learning paths include access to PMA's new and improved Press Technician training organized into three learning paths:

- Press Technician 1 prepares new operators to safely use hand-operated presses, stack and inspect parts, and monitor progressive die operations.
- Press Technician 2 prepares employees to run hand transfer and automatic presses, including understanding and operation of coil handling, straightening and feeding equipment.
- Press Technician 3 training prepares employees to run any press without assistance, with the ability to supervise other operators.

The Press Shop Operation learning paths assume learners have already been trained on workplace safety, OSHA compliance and Lock Out Tag Out.

PRESS TECHNICIAN 1

Mandatory Courses

- SAF-1002 Introduction to Safety - Making Work a Safer Place
- PMA-1001 Introduction to Metal Stamping
- PMA-1002 Stamping Presses
- PMA-1004 Press Controls
- PMA-1006 Safeguarding
- PMA-1009 Indicators of Improper Die Operations
- PMA-1010 Operating the Stamping Press
- MTH-1004 Fractions - Introduction to Fractions
- MTH-1005 Fractions - Working with Fractions

Elective Courses

- PMA-1011 Operating Coil-Fed Automatic Press Lines
- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills

PRESS TECHNICIAN 2

Mandatory Courses

- SAF-1002 Introduction to Safety - Making Work a Safer Place
- MTH-1006 Decimals - Decimal Numbers
- MTH-1007 Positive and Negative Numbers - Positive and Negative Numbers
- MTH-1009 The Metric System - The Metric System
- PMA-1007 Die Assembly Components
- PMA-1008 Basic Die Operations
- PMA-1011 Operating Coil-Fed Automatic Press Lines
- DWG-1001 Blueprint Reading Fundamentals - Introduction to Blueprints
- DWG-1002 Blueprint Reading Fundamentals - Engineering Drawing Terminology
- DWG-1005 Blueprint Reading Fundamentals - Dimensions and Tolerances
- PMA-1016 Dimensional Measuring
- PMA-1017 Attribute Gaging and Checking Fixtures

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills

PRESS TECHNICIAN 3

Mandatory Courses

- SAF-1002 Introduction to Safety - Making Work a Safer Place
- TEA-1008 Problem Solving
- PMA-1003 Press Specifications
- PMA-1005 Modes of Operation
- PMA-1012 Safe Coil Handling
- PMA-1013 Loading Coils
- PMA-1014 Straightening the Coils
- PMA-1015 Feeding the Coils
- QUA-1011 Introduction to Statistical Process Control - Introduction to SPC
- PMA-1018 Standardized Inspection Methods and SPC

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills
- TEA-1002 Group Communication
- TEA-1009 Decision Making
- TEA-1011 Leadership

INTRODUCTION TO ADVANCED MANUFACTURING

Description

PMA's Introduction to Advanced Manufacturing Learning Path immerses learners in the fundamentals of manufacturing procedures and processes in order to expose and prepare new hires with no prior manufacturing experience to the manufacturing and metalforming space. Skillsets covered include introduction level content in industrial automation, blueprint reading, lean manufacturing, logistics, precision instruments, the engineering process, and more.

Mandatory Courses

- AUT-1001 Introduction to Industrial Automation - Introduction to Automation
- AUT-1002 Introduction to Industrial Automation - Automated Process
- AUT-1003 Introduction to Industrial Automation - Automated System
- CAR-2002 Manufacturing as a Career - Components of Production
- CNC-1001 Introduction to Machining - Introduction to Machining
- DWG-1001 Blueprint Reading Fundamentals - Introduction to Blueprints
- LEA-1002 Introduction to Lean Manufacturing - The History of Lean Manufacturing
- LOG-1001 Introduction to Logistics - What is Logistics?
- LOG-1002 Introduction to Logistics - Logistics Technology
- LOG-1003 Introduction to Logistics - Inventory
- MEA-2001 Precision Measurement Tools - Introduction to Precision Instruments
- MFG-1009 Engineering Processes - The Engineering Process
- SAF-1002 Introduction to Safety - Making Work a Safer Place

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- LOG-1004 Introduction to Logistics - Distribution and Transportation
- CAR-2004 Manufacturing as a Career - Career Planning and Resources
- MFG-1001 Introduction to Manufacturing - What is Advanced Manufacturing?
- MFG-1002 Introduction to Manufacturing - Manufacturing History and Technology
- MFG-1003 Introduction to Manufacturing - From Ideas to Products
- MFG-1004 Introduction to Manufacturing - From Design to Manufacturing
- MFG-1005 Introduction to Manufacturing - Safety, Quality and the Environment in Manufacturing
- MFG-1006 Introduction to Manufacturing - Measuring Success in Manufacturing
- MFG-1007 Introduction to Manufacturing - Careers in Manufacturing
- MFG-1008 Manufacturing and Logistics Game - The Game of Manufacturing and Logistics

ADVANCED MANUFACTURING TECHNICIAN

Description

METALFORM EDU includes two Advanced Manufacturing Technician learning paths to progressively train Advanced Manufacturing Technicians in all of the key skills required for success on-the-job. Content includes blueprint reading, precision measurement, quality, mathematics for manufacturing, safety and machining.

ADVANCED MANUFACTURING TECHNICIAN 1

Mandatory Courses

- DWG-1001 Blueprint Reading Fundamentals - Introduction to Blueprints
- DWG-1002 Blueprint Reading Fundamentals - Engineering Drawing Terminology
- DWG-1003 Blueprint Reading Fundamentals - Engineering Drawing Views
- DWG-1004 Blueprint Reading Fundamentals - Engineering Drawing Lines
- DWG-1005 Blueprint Reading Fundamentals - Dimensions and Tolerances
- LEA-1003 Workplace Organization - Workplace Organization
- MEA-2001 Precision Measurement Tools - Introduction to Precision Instruments
- MEA-2002 Precision Measurement Tools - Rules
- MEA-2003 Precision Measurement Tools - Calipers
- MEA-2004 Precision Measurement Tools - Micrometers
- MFG-1010 Engineering Processes - Information Sharing
- QUA-1001 Quality Systems - Introduction to Quality
- MTH-1005 Fractions - Working with Fractions
- MTH-1006 Decimals - Decimal Numbers
- MTH-1007 Positive and Negative Numbers - Positive and Negative Numbers
- SAF-1002 Introduction to Safety - Making Work a Safer Place

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- CAR-1013 Landing a Job - Turning a Job into a Career
- MTH-1001 Basic Math - Introduction to Basic Math
- MTH-1002 Basic Math - Arithmetic Operations
- MTH-1003 Basic Math - Numbers and the Number Line
- MTH-1004 Fractions - Introduction to Fractions
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills

ADVANCED MANUFACTURING TECHNICIAN 2

Mandatory Courses

- QUA-1001 Quality Systems - Introduction to Quality
- QUA-1002 Quality Systems - ISO 9000
- QUA-1003 Quality Systems - Standards Organizations
- QUA-1004 Quality Systems - Quality Organizations
- QUA-1011 Introduction to Statistical Process Control - Introduction to SPC
- QUA-1012 Introduction to Statistical Process Control - Probability and Variation
- QUA-1013 Introduction to Statistical Process Control - The Control Chart
- CNC-1001 Introduction to Machining - Introduction to Machining
- CNC-1002 Introduction to Machining - Machine Tools
- CNC-1003 Introduction to Machining - CNC Controllers
- CNC-1004 Introduction to Machining - Machining Personnel
- CNC-1005 Introduction to Machining - Facility Layout
- MTH-1008 Cartesian Coordinates - Cartesian Coordinates
- MTH-1009 The Metric System - The Metric System
- SAF-1002 Introduction to Safety - Making Work a Safer Place

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- QUA-1005 Quality Systems - Basic Quality Roles and Responsibilities
- LEA-1004 Workplace Organization - S1: Sort
- LEA-1005 Workplace Organization - S2: Straighten
- LEA-1006 Workplace Organization - S3: Shine
- LEA-1007 Workplace Organization - S4: Standardize
- LEA-1008 Workplace Organization - S5: Sustain
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills

COMPUTER NUMERICAL CONTROL (CNC)

Description

Computer numerical control (CNC) machining centers and lathes transform raw materials into finished parts used in commercial, automotive, medical, and aerospace products. CNC machines and lathes produce parts that range from simple bolts of steel to titanium bone screws for orthopedic implants.

- The CNC Fundamentals learning paths contain the fundamental courses required to operate CNC machines, including blueprint reading; safety; geometry; metals; precision measurement tools; machining; threads, tapes and dies; cutting tools; and lubricants.
- The CNC Machining and Lathe learning paths move on to more advanced work from blueprints, setting up and operating CNC machines and lathes; loading and monitoring programs; monitoring the feed rate and speed of machines; and measuring, examining and testing completed products for defects. They also cover related content such as metal and materials, geometry, safety, and problem solving.

CNC FUNDAMENTALS 1

Mandatory Courses

- DWG-1001 Blueprint Reading Fundamentals - Introduction to Blueprints
- DWG-1002 Blueprint Reading Fundamentals - Engineering Drawing Terminology
- MAT-2001 Metals and Materials - Introduction to Metals
- CNC-1001 Introduction to Machining - Introduction to Machining
- CNC-1002 Introduction to Machining - Machine Tools
- SAF-1001 Introduction to Safety - Introduction to OSHA
- SAF-1002 Introduction to Safety - Making Work a Safer Place
- SAF-1003 Introduction to Safety - Help! What to Do in an Emergency
- SAF-1004 Personal Protective Equipment
- SAF-1021 Electrical and Fire Safety - Lockout/Tagout
- SAF-1022 Fire Safety
- SAF-1030 Tool and Machine Safety - Machine Safety
- QUA-1001 Quality Systems - Introduction to Quality
- QUA-1011 Introduction to Statistical Process Control - Introduction to SPC
- MEA-2001 Precision Measurement Tools - Introduction to Precision Instruments
- MEA-2002 Precision Measurement Tools - Rules
- MEA-2003 Precision Measurement Tools - Calipers
- MEA-2004 Precision Measurement Tools - Micrometers
- MEA-2005 Precision Measurement Tools - Small Hole Gauges
- MEA-2006 Precision Measurement Tools - Dial Indicators
- MEA-2008 Precision Measurement Tools - Height Gauges
- MEA-2007 Precision Measurement Tools - Bore Gauges
- MEA-2009 Precision Measurement Tools - Go/NoGo Gauges
- MEA-2011 Precision Measurement Tools - Go/NoGo Thread Gauges
- MTH-1008 Cartesian Coordinates - Cartesian Coordinates
- MTH-1009 The Metric System - The Metric System
- MTH-1010 Geometry - Introduction to Geometry
- MTH-1011 Geometry - Basic Building Blocks of Geometry
- MTH-1012 Geometry - Angles
- MTH-1013 Geometry - Lines
- MTH-1014 Geometry - Polygons

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- COM-1003 Verbal Communication
- COM-1006 Listening Skills
- TEA-1001 Working in a Group
- TEA-1013 Teamwork
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills

CNC FUNDAMENTALS 2

Mandatory Courses

- DWG-1003 Blueprint Reading Fundamentals - Engineering Drawing Views
- DWG-1004 Blueprint Reading Fundamentals - Engineering Drawing Lines
- DWG-1005 Blueprint Reading Fundamentals - Dimensions and Tolerances
- DWG-2001 Advanced Blueprint Reading - Geometric Dimensions and Tolerances
- DWG-2002 Advanced Blueprint Reading - Assemblies and Fits
- DWG-2003 Advanced Blueprint Reading - Threads and Fasteners
- CNC-2006 CNC Vertical Machining Center - Components of a CNC Machining Center
- CNC-2007 CNC Vertical Machining Center - CNC Machining Center Movements
- CNC-2008 CNC Vertical Machining Center - Workpiece and Tool Holding Devices for a CNC Machining Center
- CNC-2009 CNC Vertical Machining Center - The CNC Controller for a CNC Machining Center
- CNC-2010 CNC Vertical Machining Center - Auxiliary Systems for a CNC Machining Center
- CNC-2011 CNC Machine Lubricants - CNC Machine Lubricants
- CUT-2004 Threads, Taps and Dies - Threads
- CUT-2005 Threads, Taps and Dies - Taps
- CUT-2006 Threads, Taps and Dies - Hand Tapping
- CUT-2008 Lubricants and Cutting Fluids - Cutting Fluids
- CUT-2009 Cutting Tools for Metalworking - Cutting Tool Materials
- CUT-2010 Cutting Tools for Metalworking - Indexable Tool Holders
- CUT-2011 Cutting Tools for Metalworking - Inserts
- CUT-2012 Cutting Tools for Metalworking - Solid Cutting Tools
- MEA-2010 Precision Measurement Tools - Test Indicators
- MEA-2012 Precision Measurement Tools - Attribute Gauges
- MEA-2013 Precision Measurement Tools - Thickness and Radius Gauges
- MEA-2014 Precision Measurement Tools - Squares and Protractors
- MEA-2015 Precision Measurement Tools - Surface Roughness Comparators
- MEA-2016 Precision Measurement Tools - Adjustable Parallels
- MEA-2017 Precision Measurement Tools - Surface Plates
- MEA-2018 Precision Measurement Tools - Optical Comparators
- MTH-1015 Geometry - Triangles
- MTH-1016 Geometry - Quadrilaterals
- MTH-1017 Geometry - Circles
- SAF-1021 Electrical and Fire Safety - Lockout/Tagout
- SAF-1002 Introduction to Safety - Making Work a Safer Place

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- CNC-1003 Introduction to Machining - CNC Controllers
- CNC-1004 Introduction to Machining - Machining Personnel
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills

CNC MACHINING CENTER TECHNICIAN

Mandatory Courses

- DWG-2001 Advanced Blueprint Reading - Geometric Dimensions and Tolerances
- DWG-2002 Advanced Blueprint Reading - Assemblies and Fits
- DWG-2003 Advanced Blueprint Reading - Threads and Fasteners
- CNC-4015 CNC Vertical Machining Center Applications - Maintenance Tasks for a CNC Machining Center
- CNC-4016 CNC Vertical Machining Center Applications - Power on the CNC Machining Center
- CNC-4017 CNC Vertical Machining Center Applications - Move the Axes by Rotating the Jog Handle on a CNC Machining Center
- CNC-4018 CNC Vertical Machining Center Applications - Home the Axes on a CNC Machining Center
- CNC-4019 CNC Vertical Machining Center Applications - Select a Part Program from Memory on a CNC Machining Center
- CNC-4020 CNC Vertical Machining Center Applications - Start the Part Program Safely on a CNC Machining Center
- CNC-4021 CNC Vertical Machining Center Applications - Interrupt Automatic Operation on a CNC Machining Center
- CNC-4022 CNC Vertical Machining Center Applications - Adjust a Tool Wear Offset on a CNC Machining Center
- CNC-4023 CNC Vertical Machining Center Applications - Power Off the CNC Machining Center
- CNC-4024 CNC Machining Center Programs - CNC Programming Procedure for a CNC Machining Center
- CNC-4025 CNC Machining Center Programs - CNC Program Structure for a CNC Machining Center
- CNC-4026 CNC Machining Center Programs - CNC Addresses for a CNC Machining Center
- CNC-4027 CNC Machining Center Programs - CNC Machining Center Commands
- CNC-4028 CNC Machining Center Programs - Organizing a CNC Program for a CNC Machining Center
- MAT-2002 Metals and Materials - Ferrous Metals
- MAT-2003 Metals and Materials - Nonferrous Metals
- MAT-2004 Metals and Materials - Heat Treatment of Metals
- MTH-1018 Geometry - Three-dimensional Shapes
- MTH-1019 Geometry - Coordinate Geometry
- MTH-1020 Geometry - Transformation Geometry
- SAF-1021 Electrical and Fire Safety - Lockout/Tagout
- SAF-1002 Introduction to Safety - Making Work a Safer Place
- TEA-1008 Problem Solving

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills
- TIM-1001 Managing Your Time
- COM-2003 Managing Conflict
- TEA-1002 Group Communication
- TEA-1009 Decision Making
- TEA-1011 Leadership

CNC LATHE TECHNICIAN

Mandatory Courses

- SAF-1021 Electrical and Fire Safety - Lockout/Tagout
- SAF-1002 Introduction to Safety - Making Work a Safer Place
- MTH-1018 Geometry - Three-dimensional Shapes
- MTH-1019 Geometry - Coordinate Geometry
- MTH-1020 Geometry - Transformation Geometry
- DWG-2001 Advanced Blueprint Reading - Geometric Dimensions and Tolerances
- DWG-2002 Advanced Blueprint Reading - Assemblies and Fits
- DWG-2003 Advanced Blueprint Reading - Threads and Fasteners
- CNC-2001 CNC Horizontal Lathe - Components of a CNC Lathe
- CNC-2002 CNC Horizontal Lathe - Movements of a CNC Lathe
- CNC-2003 CNC Horizontal Lathe - Workholding Devices and Tooling for a CNC Lathe
- CNC-2004 CNC Horizontal Lathe - The CNC Controller for a CNC Lathe
- CNC-2005 CNC Horizontal Lathe - Auxiliary Systems for a CNC Lathe
- CNC-4001 CNC Horizontal Lathe Applications - Maintenance Tasks for a CNC Lathe
- CNC-4002 CNC Horizontal Lathe Applications - Power on the CNC Lathe
- CNC-4003 CNC Horizontal Lathe Applications - Move the Axes by Rotating the Jog Handle on a CNC Lathe
- CNC-4004 CNC Horizontal Lathe Applications - Home the Axes on a CNC Lathe
- CNC-4005 CNC Horizontal Lathe Applications - Select a Part Program from Memory on a CNC Lathe
- CNC-4006 CNC Horizontal Lathe Applications - Start the Part Program Safely on a CNC Lathe
- CNC-4007 CNC Horizontal Lathe Applications - Interrupt Automatic Operation on a CNC Lathe
- CNC-4008 CNC Horizontal Lathe Applications - Adjust a Tool Wear Offset on a CNC Lathe
- CNC-4009 CNC Horizontal Lathe Applications - Power Off the CNC Lathe
- CNC-4010 CNC Lathe Programs - CNC Programming Procedure for a CNC Lathe
- CNC-4011 CNC Lathe Programs - CNC Program Structure for a CNC Lathe
- CNC-4012 CNC Lathe Programs - CNC Addresses for a CNC Lathe
- CNC-4013 CNC Lathe Programs - CNC Lathe Commands
- CNC-4014 CNC Lathe Programs - Organizing a CNC Program for a CNC Lathe
- MAT-2002 Metals and Materials - Ferrous Metals
- MAT-2003 Metals and Materials - Nonferrous Metals
- MAT-2004 Metals and Materials - Heat Treatment of Metals
- TEA-1008 Problem Solving

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills
- COM-2003 Managing Conflict
- TIM-1001 Managing Your Time
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- TEA-1002 Group Communication
- TEA-1009 Decision Making
- TEA-1011 Leadership

ENGINEERING AND DESIGN

Description

The Engineering and Design Learning Path provides coursework for budding Drafting and CAD technicians. The learning path does not include use of CAD software for technical drawing but rather provides the core knowledge needed by technicians to work with such programs, including blueprint reading fundamentals, GD&T, geometry, and technical writing.

ENGINEERING AND DESIGN 1

Mandatory Courses

- DWG-1001 Blueprint Reading Fundamentals - Introduction to Blueprints
- DWG-1002 Blueprint Reading Fundamentals - Engineering Drawing Terminology
- DWG-1003 Blueprint Reading Fundamentals - Engineering Drawing Views
- DWG-1004 Blueprint Reading Fundamentals - Engineering Drawing Lines
- DWG-1005 Blueprint Reading Fundamentals - Dimensions and Tolerances
- DWG-2001 Advanced Blueprint Reading - Geometric Dimensions and Tolerances
- DWG-2002 Advanced Blueprint Reading - Assemblies and Fits
- DWG-2003 Advanced Blueprint Reading - Threads and Fasteners
- MTH-1008 Cartesian Coordinates - Cartesian Coordinates
- MTH-1009 The Metric System - The Metric System
- MTH-1010 Geometry - Introduction to Geometry
- MTH-1011 Geometry - Basic Building Blocks of Geometry
- MTH-1012 Geometry - Angles
- MTH-1013 Geometry - Lines
- MTH-1014 Geometry - Polygons
- MTH-1015 Geometry - Triangles
- MTH-1016 Geometry - Quadrilaterals
- MTH-1017 Geometry - Circles

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills

ENGINEERING AND DESIGN 2

Mandatory Courses

- MTH-1018 Geometry - Three-dimensional Shapes
- MTH-1019 Geometry - Coordinate Geometry
- MTH-1020 Geometry - Transformation Geometry
- COM-2004 Technical Writing - Introduction to Technical Writing
- COM-2005 Technical Writing - Successful Documentation
- DWG-3001 Geometric Dimensioning and Tolerancing - Introduction to GD&T
- DWG-3002 Geometric Dimensioning and Tolerancing - GD&T Terms and Symbols
- DWG-3003 Geometric Dimensioning and Tolerancing - Rules of GD&T
- DWG-3004 Geometric Dimensioning and Tolerancing - Geometric Tolerances
- DWG-3005 Geometric Dimensioning and Tolerancing - Datums
- DWG-3006 Geometric Dimensioning and Tolerancing - Form Tolerances
- DWG-3007 Geometric Dimensioning and Tolerancing - Profile Tolerances
- DWG-3008 Geometric Dimensioning and Tolerancing - Orientation Tolerances
- DWG-3009 Geometric Dimensioning and Tolerancing - Runout Tolerances
- DWG-3010 Geometric Dimensioning and Tolerancing - Location Tolerances
- TEA-1008 Problem Solving

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- CAR-1013 Landing a Job - Turning a Job into a Career
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills
- COM-2003 Managing Conflict
- LEA-1003 Workplace Organization - Workplace Organization
- MFG-1006 Measuring Success in Manufacturing
- TEA-1002 Group Communication
- TEA-1009 Decision Making
- TEA-1011 Leadership
- TIM-1001 Managing Your Time
- TIM-1009 When Time Gets the Best of You: Dealing with Stress

MAINTENANCE TECHNICIAN

Description

Mechatronics is the convergence of mechanical, electronic, control, and software engineering. Also known as electro-mechanical maintenance technicians, mechatronics and industrial automation technicians combine knowledge of mechanical technology with knowledge of electrical circuits. They install, troubleshoot, repair, and upgrade electronic and computer-controlled mechanical systems, such as robotic assembly machines. The Maintenance Technician learning paths prepare employees for work in this field, exposing them to pneumatics, hydraulics, robotics, electronics, PLC, and process controls.

MAINTENANCE TECHNICIAN 1

Mandatory Courses

- AUT-1001 Introduction to Industrial Automation - Introduction to Automation
- AUT-1002 Introduction to Industrial Automation - Automated Process
- AUT-1003 Introduction to Industrial Automation - Automated System
- MTH-1008 Cartesian Coordinates - Cartesian Coordinates
- PNE-1001 Introduction to Pneumatics - Introduction to Pneumatics
- PNE-1002 Introduction to Pneumatics - Pneumatic Systems
- PNE-1003 Introduction to Pneumatics - The Properties of Gases
- PNE-1004 Introduction to Pneumatics - Air Compression and Distribution - Part One
- PNE-1005 Introduction to Pneumatics - Air Compression and Distribution - Part Two
- HYD-1001 Introduction to Hydraulics - Introduction to Hydraulics
- HYD-1002 Introduction to Hydraulics - Hydraulic Theory
- HYD-1003 Introduction to Hydraulics - Hydraulic Fluids
- HYD-1004 Introduction to Hydraulics - Hydraulic Systems
- ELE-1001 Introduction to Electricity - Production of Electricity
- ELE-1002 Introduction to Electricity - Transmission and Distribution of Electricity
- ELE-1003 Introduction to Electricity - Uses of Electricity
- ELE-1004 Introduction to Electricity - Atomic Structure
- ELE-1005 Introduction to Electricity - Electrical Circuits
- ELE-1006 Introduction to Electricity - Electrical Current
- ELE-1007 Introduction to Electricity - Voltage
- ELE-1008 Introduction to Electricity - Electrical Power
- ELE-1009 Introduction to Electricity - Resistance
- ELE-1010 Introduction to Electricity - Ohm's Law
- ELE-1011 Introduction to Electricity - Watt's Law
- PLC-1001 Programmable Logic Controllers - Introduction to Programmable Controllers
- PLC-1002 Programmable Logic Controllers - Introduction to Digital Electronics
- ROB-1001 Robotics - Introduction to Robotics
- ROB-1002 Robotics - Robot Safety

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills

MAINTENANCE TECHNICIAN 2

Mandatory Courses

- ELE-1012 DC Electricity - Direct Current
- ELE-1013 DC Electricity - Batteries
- ELE-1014 DC Electricity - Circuit Analysis
- ELE-1015 AC Electricity - Electromagnetism
- ELE-1016 AC Electricity - AC Waveform Generation
- ELE-1017 AC Electricity - Electromagnetic Devices
- ELE-1018 AC Electricity - Transformers
- ELE-1019 AC Electricity - Capacitors
- ELE-1020 Solid State Electricity - Semiconductors
- ELE-1021 Solid State Electricity - Solid State Devices
- ELE-2001 Introduction to Wiring - Wires, Connectors, and Circuit Protection
- ELE-2002 Introduction to Wiring - Connecting Transformers
- ELE-2003 Introduction to Electric Motors - DC Motors
- ELE-2004 Introduction to Electric Motors - AC Single-Phase Motors
- ELE-2005 Introduction to Electric Motors - Three-Phase AC Motors
- ELE-2006 Electrical Connectors - Electrical Connectors and Fasteners
- PNE-2001 Components of a Pneumatic System - Compressed Air Treatment
- PNE-2002 Components of a Pneumatic System - Pneumatic Actuators
- PNE-2003 Components of a Pneumatic System - Directional Control Valves
- PNE-2004 Components of a Pneumatic System - Vacuum Technology
- PNE-2005 Components of a Pneumatic System - Measuring Pneumatic Variables
- PNE-3001 Pneumatic Applications - Pneumatic Applications
- AUT-2001 Process Controls - Introduction to Process Controls
- AUT-2002 Process Controls - Process Control Systems
- AUT-2003 Process Controls - Set Point/Comparator
- AUT-2004 Process Controls - Controller (PID Control)
- AUT-2005 Process Controls - Multivariate Processes

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills

MAINTENANCE TECHNICIAN 3

Mandatory Courses

- ELE-2012 Sensor Technology - Introduction to Sensors Technology
- ELE-2013 Sensor Technology - Sensor Technology
- ELE-2014 Sensor Technology - Proximity Sensors
- ELE-2015 Sensor Technology - Position, Speed, and Acceleration Sensors
- ELE-2016 Sensor Technology - Industrial Process Sensors
- ELE-2017 Sensor Technology - Advanced Sensors
- ELE-2019 Electrical Measurement Conversion - Electrical Measurement and Unit Conversion
- HYD-2001 Components of a Hydraulic System - Hydraulic Actuators
- HYD-2002 Components of a Hydraulic System - Classification of Hydraulic Valves
- HYD-2003 Components of a Hydraulic System - Hydraulic Piping and Instrumentation
- HYD-2004 Components of a Hydraulic System - Hydroelectric Symbolology and Circuits
- PLC-2001 Programmable Logic Controllers - Types and Functions of Programmable Controllers
- PLC-2002 Programmable Logic Controllers - General Structure of PLC
- PLC-2003 Programmable Logic Controllers - Physical Integration of the PLC
- PLC-2004 Programmable Logic Controllers - Internal Structure of the CPU
- PLC-2005 Programmable Logic Controllers - Basic Concepts of PLC Programming
- PLC-2006 Programmable Logic Controllers - Common PLC Applications
- ROB-2001 Robotics - Robot Axes
- ROB-2002 Robotics - Robot Manipulator
- ROB-2003 Robotics - Controller and End Effectors
- ROB-2004 Robotics - Robot Programs
- ROB-2005 Robotics - Industrial Robot Applications
- TEA-1008 Problem Solving

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- TIM-1001 Managing Your Time
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills
- COM-2003 Managing Conflict
- TEA-1002 Group Communication
- TEA-1009 Decision Making
- TEA-1011 Leadership

QUALITY ASSURANCE TECHNICIAN

Description

When products like cell phones, computers or automobiles leave the factory, it is the quality assurance technician who makes sure they work. Also known as inspectors or testers, quality assurance technicians work on a wide range of challenging projects across multiple industries. Critical to the success of any product development team, they make a difference. Quality assurance technicians reduce the cost of production, decrease maintenance expenses, and increase customer safety and satisfaction. The Quality Assurance Technician learning path prepares learners for careers in this area, covering critical content in quality, blueprint reading, GD&T, Statistical Process Control (SPC) and more. Just as important in this role is the ability to work well with people, and as such, content also covers areas like conflict resolution and management, communication skills and teamwork.

QUALITY ASSURANCE TECHNICIAN 1

Mandatory Courses

- MTH-1008 Cartesian Coordinates - Cartesian Coordinates
- MTH-1009 The Metric System - The Metric System
- QUA-1001 Quality Systems - Introduction to Quality
- QUA-1002 Quality Systems - ISO 9000
- QUA-1003 Quality Systems - Standards Organizations
- QUA-1004 Quality Systems - Quality Organizations
- QUA-1005 Quality Systems - Basic Quality Roles and Responsibilities
- DWG-1001 Blueprint Reading Fundamentals - Introduction to Blueprints
- DWG-1002 Blueprint Reading Fundamentals - Engineering Drawing Terminology
- DWG-1003 Blueprint Reading Fundamentals - Engineering Drawing Views
- DWG-1004 Blueprint Reading Fundamentals - Engineering Drawing Lines
- DWG-1005 Blueprint Reading Fundamentals - Dimensions and Tolerances
- MEA-2001 Precision Measurement Tools - Introduction to Precision Instruments
- MEA-2002 Precision Measurement Tools - Rules
- MEA-2003 Precision Measurement Tools - Calipers
- MEA-2004 Precision Measurement Tools - Micrometers
- MEA-2005 Precision Measurement Tools - Small Hole Gauges
- MEA-2006 Precision Measurement Tools - Dial Indicators
- MEA-2007 Precision Measurement Tools - Bore Gauges
- MEA-2008 Precision Measurement Tools - Height Gauges
- MEA-2009 Precision Measurement Tools - Go/NoGo Gauges
- MEA-2010 Precision Measurement Tools - Test Indicators
- MEA-2011 Precision Measurement Tools - Go/NoGo Thread Gauges
- MEA-2012 Precision Measurement Tools - Attribute Gauges
- MEA-2013 Precision Measurement Tools - Thickness and Radius Gauges
- MEA-2014 Precision Measurement Tools - Squares and Protractors
- MEA-2015 Precision Measurement Tools - Surface Roughness Comparators
- MEA-2016 Precision Measurement Tools - Adjustable Parallels
- MEA-2017 Precision Measurement Tools - Surface Plates
- MEA-2018 Precision Measurement Tools - Optical Comparators
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills
- COM-2003 Conflict Resolution - Managing Conflict
- TEA-1013 Teamwork

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing

QUALITY ASSURANCE TECHNICIAN 2

Mandatory Courses

- DWG-2001 Advanced Blueprint Reading - Geometric Dimensions and Tolerances
- DWG-2002 Advanced Blueprint Reading - Assemblies and Fits
- DWG-2003 Advanced Blueprint Reading - Threads and Fasteners
- DWG-3001 Geometric Dimensioning and Tolerancing - Introduction to GD&T
- DWG-3002 Geometric Dimensioning and Tolerancing - GD&T Terms and Symbols
- DWG-3003 Geometric Dimensioning and Tolerancing - Rules of GD&T
- DWG-3004 Geometric Dimensioning and Tolerancing - Geometric Tolerances
- DWG-3005 Geometric Dimensioning and Tolerancing - Datums
- DWG-3006 Geometric Dimensioning and Tolerancing - Form Tolerances
- DWG-3007 Geometric Dimensioning and Tolerancing - Profile Tolerances
- DWG-3008 Geometric Dimensioning and Tolerancing - Orientation Tolerances
- DWG-3009 Geometric Dimensioning and Tolerancing - Runout Tolerances
- DWG-3010 Geometric Dimensioning and Tolerancing - Location Tolerances
- QUA-1006 Quality Management - Quality Concepts
- QUA-1007 Quality Management - The Cost of Quality
- QUA-1008 Quality Management - Managing Quality
- QUA-1009 Quality Management - Quality Documents
- QUA-1010 Quality Management - Corrective and Preventive Action
- QUA-1011 Introduction to Statistical Process Control - Introduction to SPC
- QUA-1012 Introduction to Statistical Process Control - Probability and Variation
- QUA-1013 Introduction to Statistical Process Control - The Control Chart
- QUA-2001 Advanced Statistical Process Control - Control Chart Analysis
- QUA-2002 Advanced Statistical Process Control - Process Capability
- QUA-2003 Advanced Statistical Process Control - Problem Solving Tools
- QUA-2004 Advanced Statistical Process Control - Problem Solving
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills
- COM-2003 Conflict Resolution - Managing Conflict

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing

NON-DESTRUCTIVE EXAMINATION

Description

The Non-destructive Examination (NDE) learning path provides an overview of key NDE concepts, including the NDE process, methods, personnel qualification, visual testing, product standards and more.

Mandatory Courses

- NDE-3037 What is Nondestructive Examination?
- NDE-3038 The NDE Process
- NDE-3039 Materials
- NDE-3040 Metals Manufacturing and Processes
- NDE-3041 Testing of Material Properties
- NDE-3042 Loads, Stresses, and Discontinuities
- NDE-3043 Fracture Mechanics
- NDE-3044 NDE Methods
- NDE-3045 Personnel Qualification
- NDE-3046 Introduction to Visual Testing
- NDE-3047 Light
- NDE-3048 Standard Inspection Techniques
- NDE-3049 Visual Testing Equipment
- NDE-3050 Hierarchy of Product Standards
- NDE-3052 Visual Testing of Rolled Products
- NDE-3053 Visual Testing of Welds
- NDE-3054 VT in Industrial Components

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills

SIX SIGMA GREEN BELT

Description

Green Belts are employees of an organization who have been trained on the Six Sigma improvement methodology and will lead a process improvement team as part of their full-time job. PMA's Six Sigma Green Belt learning path provides the coursework required for employees to pursue their Green Belt, which will enable them to help strengthen your organization by understanding, interpreting and using the core concepts of Six Sigma. This learning path is designed for professionals with little or no prior experience with Six Sigma methodologies.

Mandatory Courses

- SIX-3001 Six Sigma and the Organization
- LEA-1001 Lean Principles
- SIX-3003 Design for Six-Sigma
- SIX-3004 Process Elements for Projects
- SIX-3005 Project Management Basics
- SIX-3006 Management and Planning Tools
- SIX-3007 Business Results for Improvement Projects
- SIX-3008 Project Team Dynamics and Performance
- SIX-3009 Problem Solving Tools
- SIX-3010 Process Analysis and Documentation
- SIX-3011 Probability and Statistics
- SIX-3012 Collecting and Summarizing Data
- SIX-3013 Probability Distributions
- SIX-3014 Measurement System Analysis
- SIX-3015 Process Capability Performance
- SIX-3016 Exploratory Data Analysis
- SIX-3017 Hypotheses Test Basics
- SIX-3018 Hypotheses Tests
- SIX-3019 Design of Experiments
- SIX-3020 SPC
- SIX-3021 Implement and Validate
- SIX-3022 Control Plans

Elective Courses

- STU-1002 Using a Learning Management System - How to Take a Course
- STU-1004 Learning Online - Tips for Succeeding in Online Learning
- TIM-1009 When Time Gets the Best of You: Dealing with Stress
- MFG-1006 Measuring Success in Manufacturing
- COM-2001 Understanding Conflict
- COM-2002 Communication Skills

PMA COURSES

Press Shop Operations
PMA-1001 INTRODUCTION TO METAL STAMPING

Course Description

In stamping, a stamping press is used to make a variety of small or large parts. In this module, you'll learn about the stamping press and become familiar with some key stamping terms. You'll also find out how the basic stamping process works and discover the four components present in all stamping presses.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a stamping press
- Understand the responsibilities of a press operator
- Define key stamping terms
- Explain the stamping process
- Describe how to remove slugs and scrap
- List the four basic components of all stamping presses

Estimated completion time (hours): 0.9

PMA-1002 STAMPING PRESSES

Course Description

In this course, you will learn about two different types of presses: a gap frame press and a straight side press. You will discover the various components of each type of press and how the basic stamping process works. You will also learn about the important stopping characteristics of full-revolution and part-revolution clutch presses.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the two different types of presses
- Describe the different types of press construction
- List the components of a gap frame press and a straight side press
- Explain how a press operates
- Understand the stopping characteristics of a full-revolution clutch press and a part-revolution clutch press

Estimated completion time (hours): 0.9

PMA-1003 PRESS SPECIFICATIONS

Course Description

This course explains how to read the press data specification plate attached to the press. You will learn about the two types of specification plates and how to interpret each line of information on the plate. You will also find out why counterbalancing is important.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the two types of press specification plates
- Determine the size and adjustment limits of a stamping press
- Explain the purpose of counterbalancing

Estimated completion time (hours): 0.9

PMA-1004 PRESS CONTROLS

Course Description

As a press technician, you need to be able to identify and operate the controls and main power disconnect on each component of your press. In this module, you’ll learn the function of each control, how to stop the press in an emergency, and how to shut off the press.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify basic press controls
- Describe how to turn on the press
- Explain how to start and stop the press
- Describe how to stop the press in an emergency
- Explain how to shut off the press

Estimated completion time (hours): 0.9

PMA-1005 MODES OF OPERATION

Course Description

As a press technician, you need to be able to identify and operate the modes and main power disconnect on each component of your press. In this module, you’ll learn the functions of basic modes on a stamping press.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify modes of operation
- Explain how to turn on the press
- Explain how to start and stop the press
- Describe how to stop the press in an emergency
- Explain how to shut off the press

Estimated completion time (hours): 0.8

PMA-1006 SAFEGUARDING

Course Description

Permanent and disabling injuries can occur when press operators do not pay close attention to what they’re doing. In this course, you will learn what you can do to remain safe while operating stamping presses.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the hazards of metal stamping
- Understand the importance of safety and warning signs
- List ways to dress for safety
- Explain the difference between safeguarding devices and guards
- Describe the purpose of safety tongs

Estimated completion time (hours): 1.3

PMA-1007 DIE ASSEMBLY

Course Description

In this course, you will learn about die assembly components. You will find out about three types of punches used in dies as well as other components of a die assembly and their functions. You will also learn about shut height and three different types of dies.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify common die assembly components
- Explain the function of common die assembly components
- List the three types of punches
- Explain shut height
- Describe the differences between single station, progressive, and transfer dies

Estimated completion time (hours): 1.3

PMA-1008 BASIC DIE OPERATIONS

Course Description

Manually operated and coil-fed stamping presses perform similar operations: They create piece parts with various features. In this course, you will learn about the different types of cutting, forming, and drawing operations. You will also find out about redraws and secondary operations.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify three major types of press operations
- Describe cutting operations
- Describe forming operations
- Describe drawing operations
- Define redraws

Estimated completion time (hours): 1.1

PMA-1009 INDICATORS OF IMPROPER DIE OPERATIONS

Course Description

The piece parts produced by a stamping press can reveal improper die operations or other related issues. In this course, you will discover some visual indicators of improper operation.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe visual indicators of improper stamping in cutting operations
- Describe visual indicators of improper stamping in forming and drawing operations

Estimated completion time (hours): 0.9

PMA-1010 OPERATING THE STAMPING PRESS

Course Description

Understanding and following safe operation procedures are critical to your personal safety. Before starting and operating a press, you will need to conduct a preproduction visual inspection and read the operator work instructions. You will also need to follow the correct procedures for starting and operating a press and make sure that a piece part is removed before the press cycles again.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the preproduction visual inspection steps you must perform prior to operating the press or other equipment
- List the contents of operator work instructions
- Explain how to start and operate a press
- Define a miss-hit
- Explain the possible causes and consequences of failing to remove a piece part before the press cycles again

Estimated completion time (hours): 1.0

PMA-1011 OPERATING COIL-FED AUTOMATIC PRESS LINES

Course Description

This course discusses the operation of coil-fed automatic press lines. These press lines use different cycling modes than those of manually fed presses and include automation components of the feed line that require the operator to learn and follow additional operation procedures for safe operation.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the components in an automatic press line
- Describe the press operator’s responsibilities
- Explain the importance of a slack loop

Estimated completion time (hours): 1.1

PMA-1012 SAFE COIL HANDLING

Course Description

In this course, you will find out how to safely handle coils. You will learn about coil conditions to look for prior to handling, as well as the different types of coiling handling equipment and coil lifting devices. You will also discover how to interpret capacity ratings and calculate the weight of a load.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe conditions to look for during coil inspection
- List the different types of coil handling equipment
- Describe the different types of coil lifting devices
- Understand capacity ratings
- Describe how to calculate the weight of a load
- Explain safe practice when handling and lifting coils

Estimated completion time (hours): 1.2

PMA-1013 LOADING COILS

Course Description

While operating a coil-fed stamping press, you may be required to load a new coil of material to replace one that has been depleted. The new coil needs to be loaded correctly so that the stamping press can continue to produce quality piece parts.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the steps the press operator must take prior to loading a coil
- Describe three types of uncoilers
- List the components of a reel
- List the components of a cradle
- Define material payout

Estimated completion time (hours): 1.1

PMA-1014 STRAIGHTENING THE COIL

Course Description

To produce satisfactory piece parts in an automatic press line, the material usually must be straightened by a straightener. In this module, you’ll learn about the purpose and function of straighteners. You’ll also learn about each component of a straightener and the process for threading coil stock through a straightener.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the purpose of a straightener
- Describe the benefits of removing coil set
- Explain how straighteners work
- List the three possible locations of a straightener
- Describe the components of a straightener
- Explain how to thread coil stock through a straightener

Training Hours: 1.3

PMA-1015 FEEDING THE COILS

Course Description

While operating an automatic press line, you may be required to load a new coil of material to replace a coil that has been depleted. It is crucial that the new coil is loaded correctly so that the stamping press can continue to produce quality piece parts.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe two common types of automatic feeds used on mechanical power presses
- Explain the process for threading coil into different types of feeds
- Describe methods for aligning the coil at the die starting position
- Explain the process of threading the coil through the die stations
- List the tasks that the press operator may be required to perform after an acceptable piece part is produced

Training Hours: 1.6

PMA-1016 DIMENSIONAL MEASURING

Course Description

You may be required to measure specific part features to determine whether they meet part quality requirements. In this module, you’ll learn about the equipment and procedures used to perform dimensional measurement. You will find out how to correctly use micrometers, calipers, and indicators to measure piece parts and how to establish zero on micrometers and indicators. You will also discover the importance of calibration.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify precision measuring tools
- Explain how to correctly use a micrometer to measure a piece part
- Describe how to establish zero on a micrometer
- Explain how to correctly use calipers to measure a piece part
- Explain how to correctly use different types of indicators to measure a piece part
- Explain how to establish zero on dial and digital indicators
- Explain the importance of calibration

Training Hours: 1.0

PMA-1017 ATTRIBUTE GAGING AND CHECKING FIXTURES

Course Description

In this course, you will learn about the gaging devices and equipment used to inspect piece parts for dimensional accuracy. You will also discover the methods for checking piece parts as well as how to use common gaging devices.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the different types of gaging devices
- Explain how to use a go/no-go plug gage and a stepped plug gage
- Explain how to use a snap gage
- Explain how to use a profile gage
- Describe the purpose of a feeler gage
- Explain how to use a checking fixture

Training Hours: 0.8

PMA-1018 STANDARDIZED INSPECTION METHODS AND SPC

Course Description

In this course, you will learn about the gaging devices and equipment used to inspect piece parts for dimensional accuracy. You’ll also discover the methods for checking piece parts as well as how to use common gaging devices.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the different types of gaging devices
- Explain how to use a go/no-go plug gage and a stepped plug gage
- Explain how to use a snap gage
- Explain how to use a profile gage
- Describe the purpose of a feeler gage
- Explain how to use a checking fixture

Training Hours: 0.5

DIE SETTER

PMA-2001 DIE FASTENING AND CLAMPING SYSTEMS

Course Description

Fasteners and clamping systems are used to secure a die assembly in the press. In this course, you will learn about the different types of fastening techniques and clamping systems used to secure a die assembly. You will find out about the factors you need to consider when choosing a clamping system. You also will discover how to properly install die clamps and avoid common mistakes.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the components used for fastening and clamping dies
- Describe how fastening and clamping are different
- List three fastening features in a die assembly
- Explain common types of basic mechanical clamping systems
- Explain the factors you need to consider when selecting clamps and fasteners
- List practices for following when installing clamps
- Describe common mistakes to avoid when securing the die assembly

Estimated completion time (hours): 0.9

PMA-2002 REMOVING THE DIE ASSEMBLY

Course Description

In this course, you will learn about removing a die assembly from a press. You will discover what you need to do to prepare for the next setup and the basic steps involved in the process of removing a die assembly.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe how to prepare for the next setup
- Explain the process of removing a die assembly

Estimated completion time (hours): 0.8

PMA-2003 PRESS SHUT HEIGHT

Course Description

To avoid damage to the die assembly, the shut height must be correct. In this course, you will find out why establishing the shut height is important. You will also discover the steps involved in setting the die-clamping shut height. Finally, you will learn about the three shut height adjustment mechanisms.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain why establishing shut height is important
- Know the difference between press shut height and die shut height
- Describe how to set the die-clamping shut height
- List the three shut height adjustment mechanisms

Estimated completion time (hours): 0.8

PMA-2004 DIE ASSEMBLY INSTALLATION

Course Description

In this course, you will learn the steps you need to follow to properly install a die assembly. You will find out how to load, position, align, and secure the die assembly. You will also discover how to make adjustments to shut height, the knockout bar, the air or die cushion, and the air counterbalance pressure.

Learning Objectives

By the end of this course, you will be able to do the following:

- Prepare the die-mounting area
- Load and position the die assembly
- Align the die assembly
- Set die-clamping shut height
- Inch the ram to bottom dead center
- Secure the die assembly
- Set the shut height to match the die assembly
- Adjust the knockout bar, if applicable
- Adjust the air or die cushion, if applicable
- Adjust the air counterbalance pressure

Estimated completion time (hours): 0.8

PMA-2005 SETTING UP UNCOILING AND STRAIGHTENING EQUIPMENT

Course Description

In this course, you will learn the steps involved in setting up uncoiling and straightening equipment. You will find out how to reposition loop control devices and load a coil. You will also discover how to pay out material to the straightener and check for material flatness.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the process of setting up uncoiling and straightening equipment
- Explain how to reposition the loop control devices on uncoilers and straighteners
- Describe the process for loading the coil
- Explain how to pay out material to the straightener
- List the steps involved in setting the straightener for the new coil
- Explain how to check for material flatness and adjust the straightener as needed

Estimated completion time (hours): 0.7

PMA-2006 AIR-OPERATED SLIDE FEEDS

Course Description

Air-operated feeds come in two types: slide feeds and grip feeds. In this course, you will learn the basic components of an air-operated slide feed. You will also discover the processes for adjusting feed height, feed length, feed timing, and feed speed on an air-operated slide feed.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the basic components of a slide feed
- Explain how to set feed height, feed length, feed timing, and feed speed
- Understand how to load the feed
- Describe how to fine-tune feed length
- Explain the process of setting the pilot release
- Describe how to perform final speed and timing adjustments

Estimated completion time (hours): 0.8

PMA-2007 GRIP FEEDS

Course Description

A grip feed uses air or hydraulic pressure to grip the stock and an air cylinder, hydraulic motor, or servo motor to move the stock into the die assembly. These type of feeds often include a pull-through straightener. In this course, you will learn how grip feeds and pull-through straighteners work. You will also discover the processes for adjusting feed height, feed length, feed timing, and feed speed on a grip feed.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the components of a grip feed and a pull-through straightener
- Explain how to set feed height, feed length, feed timing, and feed speed
- Understand how to load the feed
- Describe how to fine-tune feed length
- Explain the process of setting the pilot release
- Describe how to perform final speed and timing adjustments

Estimated completion time (hours): 0.8

PMA-2008 SERVO ROLL FEEDS

Course Description

In this course, you will learn the basic components of a servo roll feed. You will also discover the processes for adjusting feed height, feed length, feed timing and feed speed on a servo roll feed.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the basic components of a servo roll feed
- Explain how to set feed height, feed length, feed timing, and feed speed
- Understand how to load the feed
- Describe how to fine-tune feed length
- Explain the process of setting the pilot release
- Describe how to perform final speed and timing adjustments

Estimated completion time (hours): 0.8

PMA-2009 MECHANICAL ROLL FEEDS

Course Description

In this course, you will learn about cam-driven and eccentric-driven mechanical roll feeds. You will look at the basic components and operation of eccentric-driven roll feeds. You will also discover the processes for adjusting feed height, feed length, feed timing, and feed speed on a mechanical roll feed.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the two basic types of mechanical roll feeds
- Identify the basic components of mechanical roll feeds
- Explain how to set feed height, feed length, feed timing, and feed speed
- Understand how to load the feed
- Describe how to fine-tune feed length
- Explain the process of setting the pilot release
- Describe how to perform final speed and timing adjustments

Estimated completion time (hours): 0.9

PMA-2010 THREADING THE DIE

Course Description

Before you complete the setup, you will need to thread the coil through the die. In this course, you will discover the process for threading the coil through the die, which includes establishing the slack loop, adjusting the stock guide rails, making the first hit, checking the engagement of pilot pins, and setting the feed length and pilot release. You will also learn how to ensure that the coil is advancing properly, verify proper coil alignment, and adjust the pilot release timing.

Learning Objectives

By the end of this course, you will be able to do the following:

- Feed to the coil start or first hit position
- Establish the slack loop
- Adjust the stock guide rails
- Make the first hit
- Check the engagement of pilot pins
- Set the feed length and pilot release
- Ensure proper advancement of the coil
- Verify proper coil alignment
- Adjust the pilot release timing

Estimated completion time (hours): 0.7

PMA-2011 PREPARING THE PRESS FOR PRODUCTION

Course Description

In this course, you will learn how to complete the setup of both manually fed and coil-fed presses. You will discover how to position operator controls, blanks or WIPS, and conveyors or chutes. You will find out how to connect air lines, adjust the kicker’s ejection speed and timing, and connect and adjust die protection. You also will learn how to set up barrier guards and safeguarding devices, attach auxiliary equipment, position lubrication, and select the operating mode.

Learning Objectives

By the end of this course, you will be able to do the following:

- Position the operator controls
- Position and turn on conveyors or chutes
- Connect air lines to any ejection devices
- Adjust the ejection speed and timing of the kicker
- Connect and adjust die protection
- Set up, reattach, and adjust any barrier guards and safeguarding devices
- Attach and adjust auxiliary equipment
- Position lubrication

Estimated completion time (hours): 0.8

PMA-2012 TRIAL STAMPING – FIRST PIECE APPROVAL

Course Description

In this course, you will learn how to trial stamp the first parts on a stamping press. You will produce and inspect parts, adjust the press as necessary, and test your setup at speed. You will also verify press tonnage, perform quality assurance checks, obtain final approvals for production, and set the stroke counters and part counters to zero. Finally, you will review the new setup with the press operator.

Learning Objectives

By the end of this course, you will be able to do the following:

- Produce and inspect parts
- Test your setup
- Verify press tonnage
- Perform quality assurance checks
- Obtain final approvals for production
- Set the stroke counters and part counters to zero
- Review the setup with operator and begin production

Estimated completion time (hours): 0.8

METAL SPINNING

PMA-4001 INTRODUCTION TO METAL SPINNING

Course Description

In metal spinning, a metal spinning machine is used to transform metal into conical, hemispherical, or cylindrical shapes. In this module, you’ll learn the basics of metal spinning and become familiar with some key terms. You’ll also find out how the basic metal spinning process works and discover the common components of metal spinning machines.

Learning Objectives

By the end of this module, you will be able to

- Define metal spinning
- Explain the difference between a spinner and an operator
- Describe the different types of spinning machines
- Explain the spinning process
- Describe the basic components of spinning machines

Estimated completion time (hours): 1.0

PMA-4002 OPERATING THE SPINNING MACHINE

Course Description

In this module, you will learn guidelines for operating metal spinning machines safely. You’ll discover how to dress for safety. You’ll also find out the prerun safety checks you should conduct prior to operating a spinning machine. Finally, you’ll learn the steps involved in producing parts on both manual and automatic spinning machines.

Learning Objectives

By the end of this module, you will be able to

- List the ways to dress for safety
- Describe the controls on manual and automatic metal spinning machines
- Explain the prerun safety checks
- Describe how to produce a part on a manual spinning machine
- Describe how to produce a part on an automatic spinning machine

Estimated completion time (hours): 1.4

LOCKOUT TAGOUT
PMA-LOTO1 INTRODUCTION TO LOCKOUT TAGOUT

Course Description
In this course, you will learn basic information about the lockout tagout process. You will find out the purpose and use of lockout procedures as well as the situations when lockout is required. You will also discover the types of energy that can cause injury.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define lockout and tagout
 - Explain the difference between affected and authorized employees
 - List basic lockout tagout rules
 - Describe situations that require lockout
 - List the different types of energy

Estimated completion time (hours): 0.8

PMA-LOTO2 LOCKOUT TAGOUT PROCEDURES

Course Description
All authorized employees must follow specific procedures to lock out equipment. In this course, you will learn about each step in the lockout process. You will also discover the steps to remove lockout and how to handle lockout during special situations, such as shift changes and outside contractors.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List the steps for applying lockout
 - List the steps for removing lockout
 - Explain how to handle lockout during shift changes
 - Describe how to handle lockout when outside contractors are involved
 - List two basic rules that summarize your company’s lockout policy

Estimated completion time (hours): 0.8

ECONOMICS FOR MANUFACTURING
PMA-ECON1 ECONOMICS AT HOME AND AT WORK

Course Description
Economics is important, both at home and at work. In this course, you will discover what economics is and how it is related to company profit and consumer choices. You will also learn about scarcity and how consumer choices impact economics.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify how economics affects your life in practical ways
 - Describe what economics is and how it helps you make more informed decisions at home and work
 - Summarize key economic terms
 - Analyze the relationships between free market systems, profit, and competition
 - Distinguish between the roles of consumers and stockholders in free markets
 - Describe the value of sharing ideas and its effect on productivity and profit
 - Describe how managers and front-line employees work together to improve productivity and profits

Estimated completion time (hours): 1.2

PMA-ECON2 BUSINESS AND PROFITABILITY

Course Description
In this course, you will discover the meaning of key economic terms, such as costs, revenue, profit, risk, and return on investment. You will evaluate risk to reward assessment when considering investing capital into companies or new startup business ideas. You will also learn about the profit margin misconception.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define key economics terms
 - Explain the risk to reward assessment performed by stockholders and entrepreneurs
 - Explain the profit margin misconception
 - Describe the relationship of profit margins to the future success of an organization
 - Summarize the importance of teamwork and collaboration among managers and front-line associates

Estimated completion time (hours): 1.1

PMA-ECON3 COMPETITION

Course Description
In this course, you will discover how business competition drives innovation and productivity. You will learn why consumers seek out substitutions for products. You will also find out what is needed to assess a competitive advantage and how specialization and continuous improvement help drive advantage in the marketplace.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define business competition
 - Identify the benefits of competition
 - Explain the reasons why competition arises in a market
 - Summarize why consumers seek out substitutes
 - Describe how specialization, continuous improvement, and skills enhancements help drive productivity

Estimated completion time (hours): 0.9

CAREER BUILDING COURSES

JOB SKILLS

CAR-1008 MAKING A POSITIVE IMPRESSION

Course Description

In this course, you'll discover how you can increase your chances of getting a job offer. You'll learn how to make a positive impression with your appearance and handshake. You'll also find advice for how to behave when you arrive at the interview and during the interview.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the importance of making a good first impression
- Describe how to prepare for unexpected employer contact
- Explain how to reply to job contact initiated through email and by phone
- Describe how to use a phone interview to land an in-person interview
- Use your appearance to make a positive impression
- Explain how to behave when you arrive at an interview
- Describe how to shake hands properly
- Understand how body language impacts communication
- Describe how to act professionally during an interview
- List common interviewing mistakes
- Explain how to behave during lunch and video interviews

Estimated completion time (hours): 1.3

CAR-1012 SURVIVING YOUR FIRST DAY ON THE JOB

Course Description

In this course, you'll learn how to make the most out of your first day. You'll discover how you should dress and how you can alleviate first-day stress. You'll also find out what to expect on your first day of employment. Finally, you'll discover how you can create a lasting positive impression from day one.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain how to dress for your first day of employment
- List ways to prepare for your first day
- Describe what to expect on your first day
- Understand the orientation process
- List common paperwork
- Describe ways you can start creating a lasting positive impression from day one

Estimated completion time (hours): 0.7

CAR-1013 TURNING A JOB INTO A CAREER

Course Description

In this course, you'll learn what you need to do to ensure long-term success on the job. You'll find out why you need to pay attention to your soft skills, character traits, and work practices to increase the likelihood of success throughout your career.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the soft skills necessary for on-the-job success
- Describe the character traits employers desire in employees
- Identify work practices that help you turn a job into a career

Estimated completion time (hours): 1.1

PERSONAL BRANDING

CAR-1014 WHAT IS PERSONAL BRANDING?

Course Description

Everyone has a personal brand. What does your brand say about you? In your career, your personal brand can help you move forward or it can hold you back. This course introduces the concept of personal branding.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define personal brand
- Compare personal branding to corporate branding
- List some benefits of personal branding
- List some myths about personal branding
- List the steps in the personal branding process

Estimated completion time (hours): 0.9

CAR-1015 DEFINE YOUR BRAND

Course Description

Before you can live your personal brand, you must define it. Many things make up your personal brand, including your values, talents, and mission. This course explores the steps for defining your personal brand.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the steps for defining a personal brand
- List different areas to consider when assessing your brand
- Describe the importance of defining a target audience
- Describe the benefits of identifying your competition

Estimated completion time (hours): 1.0

CAR-1016 DEVELOP YOUR BRAND MESSAGES

Course Description

Your brand messages communicate your brand to your target audience. It is important to spend time and effort crafting your messages so that they convey your brand effectively. This course defines different brand messages you might choose to create.

Learning Objectives

By the end of this course, you will be able to do the following:

- Set goals for a personal brand
- Define different types of brand messages
- Write brand messages, including a brand statement, elevator speech, and tagline

Estimated completion time (hours): 1.0

CAR-1017 IMPLEMENT YOUR BRAND STRATEGY

Course Description

Once you have defined your brand and written your brand messages, you are ready to plan and implement your brand strategy. This module discusses the steps for implementing a brand strategy.

Learning Objectives

By the end of this course, you will be able to do the following:

- List methods to communicate your personal brand to others
- Brand your resume and cover letters
- Define a social media strategy
- Understand the purpose of networking

Estimated completion time (hours): 1.2

MANUFACTURING AS A CAREER
CAR-2001 A FUTURE WORTH EXPLORING

Course Description

Manufacturing jobs are on the rise in the U.S. This course discusses the benefits of working in manufacturing.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the current workforce needs in manufacturing and how that number is projected to grow over the next decade.
- Describe how manufacturing outpaces all other industries in salary, benefits, and opportunity for growth.
- Explain the history and evolution of manufacturing in the U.S.
- Describe the varied opportunities and career paths available in manufacturing.
- Explain why companies are choosing to bring manufacturing jobs back to the U.S.

Estimated completion time (hours): 1.0

CAR-2002 COMPONENTS OF PRODUCTION

Course Description

A manufacturing plant requires many components and teams of people to get a product made. It is truly amazing to see people, equipment, and machines all working together in a sort of symphony. In this course, you'll learn all the working parts of a manufacturing plant, paying close attention to the production component, as this is the department where most manufacturing employees get their start.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the six major components of production in manufacturing
- Identify and explain the different careers that each of these concentrations can offer
- Explain the benefits of cross training

Estimated completion time (hours): 0.8

CAR-2003 CREDENTIALS AND COMPETENCIES

Course Description

Although a college degree is not typically required for a production job, a solid academic and skill base is required. In this course, you'll learn about what skills are necessary for manufacturing jobs and how you can distinguish yourself from other job candidates.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the value of getting credentials
- Define STEM
- Identify the various competency levels for employment in manufacturing
- Describe various education and training programs available to job seekers

Estimated completion time (hours): 1.2

CAR-2004 CAREER PLANNING AND RESOURCES

Course Description

In this course, you'll learn the twelve major subindustries of manufacturing and some resources that can help you navigate career planning.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe twelve major subindustries in manufacturing
- Explain the benefits of networking
- Use the best online job posting sites for manufacturing
- Find manufacturing job descriptions
- Find salary and job growth information

Estimated completion time (hours): 1.2

COMMUNICATION SKILLS COURSES

INTERPERSONAL COMMUNICATIONS

COM-1001 INTRODUCTION TO COMMUNICATION

Course Description

Effective communication takes work. In this course, you'll discover the different forms of communication as well as common barriers to effective communication. You'll also learn about the communication process and responsibilities of both the sender and receiver. Finally, you'll find out about the importance of feedback and different forms of noise.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define communication
- List the three forms of communication
- Identify barriers to communication
- Describe the communication model
- Understand the responsibilities of the sender and receiver
- Understand the importance of feedback
- Identify forms of noise

Estimated completion time (hours): 0.9

COM-1002 EFFECTIVE COMMUNICATION

Course Description

Effective communication is a must at work and at home. In this course, you'll discover what effective communication is and why it's important. You'll also find out how to choose the correct medium for your message based on the medium's strengths and weaknesses. Finally, you'll learn the process for constructing effective verbal and written messages.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define effective communication
- Understand the consequences of miscommunication
- Match the choice of medium to your message's content
- List the strengths and weaknesses of verbal communication
- Identify when to use verbal communication as the medium for your message
- List the strengths and weaknesses of written communication
- Identify when to use written communication as the medium for your message
- Describe the process for constructing clear verbal and written messages

Estimated completion time (hours): 0.9

COM-1003 VERBAL COMMUNICATION

Course Description

Verbal communication is the most popular form of communication. In this course, you'll discover the different approaches to communication and how to communicate effectively face to face, over the phone, and in a videoconference. You'll also learn how to leave a clear and concise voicemail.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the different approaches to communication
- Describe how to communicate effectively face to face
- Understand how paralanguage affects verbal messages
- List ways to engage your listeners
- Describe how to communicate effectively during a phone conversation
- Understand how to leave a clear and effective voicemail
- Describe how to communicate effectively during a conference call

Estimated completion time (hours): 1.0

COM-1004 WRITTEN COMMUNICATION

Course Description

Sometimes writing communicates your message more clearly than the spoken word. In this course, you’ll learn guidelines that help you create an effective written message.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand how to construct a clear written message
- List guidelines for making your message easy to follow
- Describe the guidelines you need to consider when choosing your words
- Identify common grammar mistakes
- List common spelling errors
- Understand the need for editing
- List additional guidelines for writing business letters and memos
- Understand when to use email
- Understand email etiquette
- List guidelines for writing an email

Estimated completion time (hours): 0.9

COM-1005 NONVERBAL COMMUNICATION

Course Description

You don’t always need spoken or written words to communicate. Nonverbal communication sends a message without words. Often unintentional, nonverbal communication can reveal how a person really feels. It’s important that nonverbal communication is in sync with the words being said.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe how a person communicates without words
- Understand how body language sends a message
- Interpret different types of body language
- Describe how spatial distance impacts communication
- List ways to convey openness and acceptance

Estimated completion time (hours): 0.7

COM-1006 LISTENING SKILLS

Course Description

Listening is an important skill to master for personal and professional success. When you overcome listening barriers and practice good listening skills, you’re more likely to understand the message the way a speaker intends.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the importance of listening
- List the steps in the listening process
- Identify and overcome barriers to listening
- Describe common types of listening
- Describe how to be a good listener
- Describe how to paraphrase and mirror a message

Estimated completion time (hours): 1.0

COM-1007 WORKPLACE COMMUNICATION

Course Description

Communication in the workplace isn’t that different from communication at home. However, you’re more likely to encounter individuals who are different from you, and being respectful of each person is more important than ever for effective communication.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand how to communicate across cultures
- Understand how to communicate across generations
- Describe how to establish rapport
- List ways to communicate effectively in a group
- Describe how to address mistakes and difficult issues
- Understand how to offer a sincere apology
- Describe how to deal with a defensive person

Estimated completion time (hours): 0.8

CONFLICT RESOLUTION

COM-2001 UNDERSTANDING CONFLICT

Course Description

Conflict is inevitable and not all conflict is bad. Understanding conflict is important for everyone.

Learning Objectives

By the end of this course, you will be able to do the following:

- Give examples of conflict
- List the three views of conflict
- List the origins of conflict
- Define positive conflict
- List the indicators of positive conflict
- Define negative conflict
- List the indicators of negative conflict

Estimated completion time (hours): 2.0

COM-2002 COMMUNICATION SKILLS

Course Description

Effectively managing conflict requires good communication skills.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the importance of communication skills
- List the common types of listening
- Define empathetic listening
- Describe the guidelines for empathetic listening
- Describe the process of empathetic listening
- Describe the mirroring technique of feedback
- Define “I” statement

Estimated completion time (hours): 1.8

COM-2003 MANAGING CONFLICT

Course Description

Conflict is natural and happens all the time. Effectively managing conflict is important for everyone in an organization.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the Thomas-Kilmann styles of conflict management
- Discuss the positives and negatives of different conflict management styles
- Define positional bargaining
- Discuss the collaborative approach to conflict management
- Discuss the Interest-Based Relational approach to conflict management
- Describe the questions you should ask yourself to facilitate a win/win conflict resolution

Estimated completion time (hours): 2.3

TECHNICAL WRITING

COM-2004 INTRODUCTION TO TECHNICAL WRITING

Course Description

Technical writing is a form of technical communication used in many industries to relay complex information about products, practices, and processes to a varied audience.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define technical writing
- Describe the origin of technical writing
- List the three Cs of good technical writing
- Define clarity
- Define conciseness
- Define completeness
- Describe the importance of accuracy

Estimated completion time (hours): 1.1

COM-2005 SUCCESSFUL DOCUMENTATION

Course Description

Successful documents effectively convey necessary information.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the five steps to creating successful documents
- Identify parts of preparing to create a document
- Define primary purpose
- Describe the relationship between document content and intended audience
- Define scope
- List factors that influence the method used to deliver a document
- List common parts of documentation
- State the importance of well-organized documents
- Understand when the writing process should begin
- Describe the revision process

Estimated completion time (hours): 1.1

CUSTOMER SERVICE COURSES

CUSTOMER SERVICE

CUS-1001 FOCUSING ON YOUR CUSTOMERS

Course Description

Customers are integral to the success of any business. In this module, you'll find out who your customers are, what customer service is, who provides it, and how it affects a business's bottom line. You'll also discover the difference between customer service and customer-focused and what providing quality customer service means.

By the end of this module, you will be able to do the following:

- Understand the difference between internal and external customers
- Explain the importance of customer service
- Explain the difference between customer service and customer-focused
- Describe what it means to provide quality customer service

Estimated completion time (hours): 0.8

CUS-1002 PROVIDING FRIENDLY, COURTEOUS, AND EFFICIENT SERVICE

Course Description

Your interactions with customers set the tone for your long-term relationships. In this module, you'll learn how to greet customers and interact with them in a way that makes them repeat customers.

By the end of this module, you will be able to do the following:

- Create a positive first impression
- Describe how to greet customers
- Explain how to interact courteously and professionally with customers
- Describe how to make customers feel welcome
- Explain the importance of being effective and efficient
- Describe how to end an interaction on a positive note

Estimated completion time (hours): 0.9

CUS-1003 COMMUNICATING EFFECTIVELY WITH CUSTOMERS

Course Description

Whether you are interacting with internal or external customers, effective communication is vital. Effective communication makes it possible to understand your customers' needs.

By the end of this module, you will be able to do the following:

- Understand the importance of choosing positive words to communicate
- Define trigger phrases
- List common communication pitfalls
- Describe different forms of communication
- List advantages and disadvantages of different forms of communication
- Explain the processes for answering telephone calls, putting someone on hold, and transferring calls
- Describe how to write email messages that produce results

Estimated completion time (hours): 2.0

CUS-1004 IDENTIFYING AND MEETING CUSTOMER NEEDS

Course Description

While some customers may know right away what they'd like from a business, others do not know which products or services they're interested in. In this module, you'll discover how to ask questions to identify customer needs and what you can do to successfully meet those needs.

By the end of this module, you will be able to do the following:

- Convey to customers your interest in their wants and needs
- Identify customer needs
- Ask open-ended and closed questions
- Meet customer needs
- Explain ways to improve your listening skills
- Describe how to make appropriate recommendations

Estimated completion time (hours): 1.0

CUS-1005 BUILDING CUSTOMER RELATIONSHIPS

Course Description

Serving your customers in such a way that you build strong relationships with them helps create loyal, repeat customers. In this module, you’ll learn what you can do on a customer service front to encourage customers to return again and again.

By the end of this module, you will be able to do the following:

- Describe the importance of strong relationships with customers
- Build strong relationships with customers
- Establish rapport with customers
- Welcome returning customers
- Maintain customer relationships
- Reward repeat customers
- Build online rapport with customers

Estimated completion time (hours): 0.8

CUS-1006 RESPECTING DIVERSITY IN YOUR CUSTOMERS

Course Description

If you’re not accustomed to working with customers who are different from you, you may not be sure how to interact with them. In this module, you’ll learn guidelines for working with customers from different cultures.

By the end of this module, you will be able to do the following:

- Define diversity
- Define culture
- List strategies to better serve diverse customers
- Describe ways to overcome language barriers

Estimated completion time (hours): 0.8

CUS-1007 BETTER SERVING CUSTOMERS WITH DISABILITIES

Course Description

In this module, you’ll learn how to work well with customers with all types of disabilities. You’ll discover general guidelines for working with customers who have a variety of disabilities. You’ll also find out about special considerations when working with customers who have specific types of disabilities.

By the end of this module, you will be able to do the following:

- List different types of disabilities
- Identify potential obstacles for customers with disabilities
- Use language that focuses on the customer, not the disability
- Describe general guidelines for working with customers with all types of disabilities
- Explain special considerations when working with customers with specific disabilities

Estimated completion time (hours): 1.0

CUS-1008 DEALING WITH DIFFICULT CUSTOMERS

Course Description

In customer service, you encounter a wide range of customer personalities. While some customers are fun to work with, others are hard to work with no matter the situation. Others are simply angry. In this module, you’ll learn how to deal with different types of difficult customers.

By the end of this module, you will be able to do the following:

- Explain how to stay calm and composed when dealing with difficult customers
- Describe techniques for handling different types of difficult customers
- List ways to handle entitled customers
- Explain how to restore your relationship with difficult customers

Estimated completion time (hours): 1.0

CUS-1009 RESPONDING TO CUSTOMER COMPLAINTS

Course Description

When you work in customer service, dealing with unhappy customers is unavoidable. In this module, you’ll learn how to respond to customer complaints. You’ll also discover a problem-solving process that can help you and the customers reach a mutually agreeable solution.

By the end of this module, you will be able to do the following:

- Explain the importance of customer complaints
- List the different modes of customer complaints
- Explain how to encourage customer complaints
- Describe how to prepare for common complaints
- Explain how to choose words that help calm angry customers
- Explain how to deal with complaints promptly and to the satisfaction of the customer
- Describe the problem-solving process in customer service
- Handle customer objections to possible solutions
- Recognize the importance of following up with customers
- Explain how to use complaints to prevent issues with future customers

Estimated completion time (hours): 1.4

CUS-1010 MANAGING CONFLICT WITH INTERNAL CUSTOMERS

Course Description

Difficult situations don’t occur only with your external customers; they can occur with your internal customers as well. In this module, you’ll learn why conflict with internal customers occurs and what you can do to manage it.

By the end of this module, you will be able to do the following:

- Describe the differences between positive and negative conflict
- List the effects of negative conflict
- List the reasons why conflicts with internal customers occur
- Explain what you can do to prevent conflicts with internal customers
- Identify negative behavior
- Decide if and when to address conflict with internal customers
- Describe what you can do to help resolve conflict with internal customers

Estimated completion time (hours): 1.5

CUS-1011 HANDLING DANGEROUS WORKPLACE SITUATIONS

Course Description

Any business that provides customer service or exchanges money with the public is at an increased risk of workplace violence. In this module, you’ll learn how to identify the warning signs of possible workplace violence. You’ll also discover the actions you can take to help defuse dangerous situations and keep your workplace safe.

By the end of this module, you will be able to do the following:

- Identify workplaces at a greater risk of violence
- Describe what you can do to help prevent workplace violence
- List common triggers of workplace violence
- Explain the warning signs of workplace violence
- Describe how to calmly and effectively defuse dangerous situations

Estimated completion time (hours): 0.9

CUS-1012 COPING WITH ON-THE-JOB STRESS

Course Description

Employees who provide customer service are often affected by stress due to the nature of their work. In this module, you'll learn what you can do to better cope with on-the-job stress.

By the end of this module, you will be able to do the following:

- Define stress and burnout
- Explain the difference between good stress and bad stress
- List the effects of stress on your body
- List the signs of stress
- Explain ways to manage on-the-job stress
- Describe how you can combat stress at home

Estimated completion time (hours): 0.9

MATHEMATICS COURSES

BASIC MATH

MTH-1001 INTRODUCTION TO BASIC MATH

Course Description

Good math skills are essential for your success in manufacturing. This course introduces resources you will need when working with math.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Identify the different branches of mathematics
- Use the calculator
- Look up terms in the glossary
- Understand the importance of estimating an answer before calculating it

Estimated completion time (hours): 0.7

MTH-1002 ARITHMETIC OPERATIONS

Course Description

Arithmetic has four basic operations: addition, subtraction, multiplication, and division. Each operation has its own symbols, terminology, and rules.

Learning Objectives

By the end of this course, you will be able to do the following:

- Name the four basic arithmetic operations
- Identify the symbols for the four basic operations
- Identify the arithmetic comparator symbols
- Define the terminology used with the four basic operations
- Perform math problems using the correct order of operations

Estimated completion time (hours): 1.4

MTH-1003 NUMBERS AND THE NUMBER LINE

Course Description

In this course, you'll learn how to understand place values and explore the six different types of numbers. You'll also find out how number lines can help you compare the values of numbers.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify place values
- Explain the base ten numbering system
- Identify different types of numbers
- Distinguish a rational number from an irrational number
- Identify the parts of a number line
- Determine the value of hatch marks on a number line
- Define opposite numbers
- Determine a number's absolute value

Estimated completion time (hours): 1.1

FRACTIONS
MTH-1004 INTRODUCTION TO FRACTIONS

Course Description
A fraction represents part of a whole. Every fraction has a numerator and denominator. In this course, you'll learn what a fraction is and the parts that make one up. You'll find out how to compare fractions. You'll also discover techniques for finding the least common denominator and ordering fractions.

- Learning Objectives
By the end of this course, you will be able to do the following:
• Understand the importance of equal parts
• Identify the numerator and denominator of a fraction
• Compare fractions
• Describe how to use a fraction number line
• Understand how to solve problems using pictures
• List the different types of fractions
• Explain equivalent fractions
• Find a common denominator and the least common denominator
• Describe techniques to order fractions

Estimated completion time (hours): 1.1

MTH-1005 WORKING WITH FRACTIONS
Course Description

In this course, you will learn about fractions. You'll discover how to convert improper fractions to mixed fractions. You'll also find out how to simplify fractions and convert between fractions, decimals, and percentages. Finally, you'll learn to add, subtract, multiply, and divide fractions and solve word problems.

- Learning Objectives
By the end of this course, you will be able to do the following:
• Convert between improper fractions and mixed numbers
• Simplify fractions
• Convert between fractions, decimals, and percentages
• Add, subtract, multiply, and divide fractions
• Understand reciprocal fractions
• Add, subtract, and multiply mixed fractions
• List the steps to solve word problems

Estimated completion time (hours): 1.4

DECIMALS
MTH-1006 DECIMAL NUMBERS

Course Description
If you work with measuring instruments or engineering drawings, then you've probably encountered numbers that contain decimals. Fortunately, working with decimals isn't rocket science, so you can quickly master the basics of adding, subtracting, multiplying, and dividing decimals.

- Learning Objectives
By the end of this course, you will be able to do the following:
• Identify place values of decimal numbers
• Understand the power of tens
• Determine when to use leading and trailing zeros
• Add, subtract, multiply, and divide decimals
• Round decimal numbers

Estimated completion time (hours): 1.0

POSITIVE AND NEGATIVE NUMBERS
MTH-1007 POSITIVE AND NEGATIVE NUMBERS

Course Description
Performing arithmetic operations on numbers that have a positive or negative value initially appears tricky. However, memorizing a few rules makes easy work of calculations involving addition, subtraction, multiplication, and division.

- Learning Objectives
By the end of this course, you will be able to do the following:
• Understand the difference between a positive and negative number
• Add positive and negative numbers
• Subtract positive and negative numbers
• Multiply positive and negative numbers
• Divide positive and negative numbers

Estimated completion time (hours): 0.9

CARTESIAN COORDINATES
MTH-1008 CARTESIAN COORDINATES

Course Description
In manufacturing, you can use the Cartesian coordinate system to identify precise locations on a part. The Cartesian coordinate system uses coordinates to identify the location of a point on a plane or in space.

- Learning Objectives
By the end of this course, you will be able to do the following:
• Define the Cartesian coordinate system
• Identify axes
• Define and plot points in the two-dimensional and three-dimensional Cartesian systems
• Plot points in different quadrants

Estimated completion time (hours): 0.9

THE METRIC SYSTEM
MTH-1009 THE METRIC SYSTEM

Course Description
The metric system is often used in manufacturing to measure distance, weight, and volume. To work in manufacturing, you need to understand how to work with the metric system.

- Learning Objectives
By the end of this course, you will be able to do the following:
• Describe two systems of measurement
• Identify metric units for length, weight, and volume
• Convert between metric units
• Convert from inches to millimeters
• Convert from millimeters to inches

Estimated completion time (hours): 1.1

GEOMETRY
MTH-1010 INTRODUCTION TO GEOMETRY

Course Description
Geometry is a branch of mathematics that deals with the measurement, properties, and relationships of lines, triangles, circles, and other geometric shapes. This course introduces you to the study of geometry.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify the contribution of Euclid to modern geometry
 - Use the calculator
 - Look up terms in the glossary

Estimated completion time (hours): 0.7

MTH-1011 BASIC BUILDING BLOCKS OF GEOMETRY
Course Description
The study of geometry begins with the definitions of basic geometric shapes. In this course, you will learn about points, lines, and other geometric shapes.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Describe points, lines, line segments, rays, and planes
 - Define the terms collinear, congruent, and coplanar
 - Describe three-dimensional space

Estimated completion time (hours): 0.8

MTH-1012 ANGLES
Course Description
Angles are formed by two rays that have a common endpoint. This course covers angles, how they are named, how they are measured, and different terminology related to angles.

- Learning Objectives**
- By the end of this course, you will be able to do the following:
 - Define an angle
 - Measure angles using a protractor
 - Categorize angles based on their measurements
 - Identify angle pairs

Estimated completion time (hours): 0.9

MTH-1013 LINES
Course Description
Lines are one-dimensional geometric shapes composed of a set of continuous points that extend infinitely in either direction. This course explores the properties of lines.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define intersecting and parallel lines
 - Define perpendicular and oblique lines
 - Describe a transversal
 - List the angle pairs created by a transversal

Estimated completion time (hours): 0.9

MTH-1014 POLYGONS
Course Description
The term poly means many or much. A polygon is a figure with many sides. This course explores the properties of polygons.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define the term polygon
 - Describe interior and exterior angles of a polygon
 - Define regular and irregular polygons
 - Perform calculations on the interior and exterior angles of a polygon

Estimated completion time (hours): 1.1

MTH-1015 TRIANGLES
Course Description
Triangles are polygons that have three sides. You probably see triangles every day in architecture or other areas of life. This course covers the properties of triangles, including right triangles.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Classify triangles based on their angles and sides
 - Calculate the area of a triangle
 - Calculate the lengths of the sides of a right triangle using the Pythagorean theorem
 - Understand the proportions of 30o-60o-90o and 45o-45o-90o right triangles
 - Calculate the length of a side or the measure of an angle using trigonometric functions

Estimated completion time (hours): 1.3

MTH-1016 QUADRILATERALS
Course Description
A quadrilateral is a polygon with four straight sides. This course introduces quadrilaterals, including the parallelogram, kite, and trapezoid.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify quadrilaterals
 - List the properties of quadrilaterals
 - Calculate the area of a quadrilaterals

Estimated completion time (hours): 0.9

MTH-1017 CIRCLES
Course Description
You see circles every day, from the tires on your car, to the rim of your coffee mug. This course covers circles, including how to calculate the area of a circle.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define a circle
 - Define terms related to circles, including radius, chord, and diameter
 - Measure arcs
 - Define pi
 - Calculate the circumference of a circle
 - Calculate the length of an arc
 - Calculate the area of a circle
 - Calculate the area of a sector

Estimated completion time (hours): 0.9

MTH-1018 THREE-DIMENSIONAL SHAPES

Course Description

The objects that you interact with each day are three dimensional – they have length, width, and height. In this course, you will learn about three-dimensional shapes and their properties.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define three-dimensional shapes
- Calculate the surface area and volume of a prism
- Calculate the surface area and volume of a cylinder
- Calculate the surface area and volume of a regular pyramid
- Calculate the surface area and volume of a right circular cone
- Calculate the surface area and volume of a sphere

Estimated completion time (hours): 1.1

MTH-1019 COORDINATE GEOMETRY

Course Description

Coordinate geometry uses a Cartesian coordinate system to analyze shapes such as lines or circles. In this course, you will work with a two-dimensional coordinate system.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand a two-dimensional coordinate system
- Calculate the length of a line segment
- Calculate the midpoint of a line segment
- Calculate the slope of a line
- Understand the equation of a line
- Understand the equation of a circle

Estimated completion time (hours): 1.2

MTH-1020 TRANSFORMATION GEOMETRY

Course Description

Geometric transformations change the size, orientation, or location of shapes. In this course, you will explore geometric transformations.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand transformations, including translations, reflections, glide reflections, rotations, and dilations
- Describe the effects of transformations on orientation
- Describe symmetry
- Describe transformations on the XY plane
- Understand composite transformations

Estimated completion time (hours): 0.9

TIME

MTH-1021 TIME

Course Description

Telling time is an important life skill. Whether you’re heading to work or meeting a friend for lunch, you’ll want to know what time it is so that you can arrive on time.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the concept of time
- Identify units of time
- Describe two tools to measure time
- Explain how to read a calendar
- Explain the difference between a 12-hour and 24-hour clock
- Describe how to tell time on an analog and digital clock
- Explain how to add and subtract times
- Understand time zones

Estimated completion time (hours): 1.2

MONEY

MTH-1022 MONEY

Course Description

Every day in life, you will deal with money. Whether you’re buying food at the grocery store or gas for your car, it’s important that you know how to use money to pay for goods and services.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define money
- Identify U.S. currency
- Know the value of U.S. currency
- Count money
- Add and subtract money
- Estimate sums
- Explain how to give change

Estimated completion time (hours): 1.0

MICROSOFT OFFICE COURSES

MSO-1001 GETTING STARTED WITH EXCEL

Course Description

Excel is a powerful software tool for organizing and analyzing data. It is widely used by businesses to work with financial data. Before using Excel, you must understand some terminology and the different areas of the Excel screen.

By the end of this module, you will be able to do the following:

- Understand the uses of Excel
- Define workbook and worksheet
- Describe the different areas of the Excel screen
- Define cell and range
- Identify cell and range addresses
- List methods for selecting cells and ranges

Estimated completion time (hours): 1.3

MSO-1002 ENTERING TEXT AND VALUES

Course Description

Creating a worksheet begins with entering text and values. The text and values can be any type of data, such as students' grades, a family budget, customer addresses, sales data, and other financial data.

By the end of this module, you will be able to do the following:

- Explain the difference between text and values
- List the data entry process
- Describe how Excel handles leading and trailing zeros
- Edit data
- Delete data
- Explain how to use Undo and Redo
- Move data
- Copy data
- List common keyboard shortcuts
- Describe how to use Flash Fill, AutoComplete, and AutoFill to enter data

Estimated completion time (hours): 1.5

MSO-1003 FORMATTING DATA

Course Description

Various formatting commands built into Excel enable you to change the look of your worksheet and make important data stand out. Formatting can be applied to single cells or to a range of cells either before or after you enter your data.

By the end of this module, you will be able to do the following:

- Define formatting
- Describe the process for formatting text and values
- Change the column width or row height
- Explain the purpose of specific formatting options
- Describe what happens to cells when data is deleted
- Discuss how to clear formatting
- Define cell styles and themes
- Explain what happens when you use Format Painter and F4

Estimated completion time (hours): 1.8

MSO-1004 FORMULAS AND FUNCTIONS

Course Description

Formulas and functions enable you to perform calculations on a worksheet. Excel can perform simple calculations, such as summing a column of numbers, or very complex calculations such as calculating financial, statistical or engineering information.

By the end of this module, you will be able to do the following:

- Define formula and function
- List the mathematical operators used in Excel
- Explain how references to cells or ranges are used in formulas and functions
- Use the Sum and Average functions
- Use the AutoSum command
- Understand how to copy formulas and functions
- Explain relative and absolute cell references
- Understand how to move formulas and functions
- Describe methods for troubleshooting formulas and functions

Estimated completion time (hours): 1.7

MSO-1005 WORKING WITH DATES AND TIMES

Course Description

Excel enables you to enter dates and times on your worksheet, format them, and use them in calculations like other values. However, there are some rules and limitations you must be aware of so that any calculation using dates and times is accurate.

By the end of this module, you will be able to do the following:

- List uses for dates and times in a worksheet
- Explain the serial numbers Excel uses to create dates and times
- Enter dates and times in valid formats
- Explain how to use the Today and Now functions
- Use keyboard shortcuts to enter the current date and current time
- Format dates and times using predefined formats and custom formats
- Use dates and times in formulas

Estimated completion time (hours): 1.3

MSO-1006 WORKING WITH DATA TABLES

Course Description

Excel includes commands designed to make it faster and easier to work with data that is arranged in a table. If your data is arranged in a table, you will find the Excel's TableTools very beneficial.

By the end of this module, you will be able to do the following:

- Describe a table
- Insert a table
- Change the table style and the worksheet theme
- Insert a total row and then insert functions
- Describe how to resize the table
- Insert a calculated column
- Sort and filter data
- Remove duplicate records from the table
- Convert a table to a range

Estimated completion time (hours): 1.6

MSO-1007 DISPLAYING DATA IN CHARTS

Course Description

There is an old saying that a picture is worth a thousand words. Excel's chart tools enable you to present complex data in an easy to understand visual format.

By the end of this module, you will be able to do the following:

- Create a chart based on Excel data
- Define common chart elements
- Describe how to change the chart layout, colors, style, or other options
- Explain how to reposition or resize a chart
- Create and edit Sparklines

Estimated completion time (hours): 1.4

MSO-1008 PRINTING A WORKSHEET

Course Description

The printing process enables you to print physical copies of your worksheet. Excel provides many options to specify what is included on the printout and how it should look.

By the end of this module, you will be able to do the following:

- Explain the printing process
- Describe the print window and print preview
- Switch between different document views
- Change the margins, orientation, and paper size
- Select a print area
- Understand manual and automatic page breaks
- Change the scale of the document
- Insert headers and footer

Estimated completion time (hours): 1.0

PERSONAL FINANCES COURSES

PERSONAL FINANCES

PFI-1001 COMPENSATION

Course Description

When you work, you earn compensation. This course defines three categories of compensation: monetary, deferred, and nonmonetary compensation.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain monetary compensation
- Define gross pay, deductions, and net pay
- Describe the benefits of direct deposit
- Explain deferred compensation
- Explain nonmonetary compensation

Estimated completion time (hours): 0.9

PFI-1002 GOAL SETTING

Course Description

To reach your financial goals, you will need to spend some time setting goals and creating a plan to achieve them. This course explores the goal setting process.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define assets and liabilities
- Calculate your net worth
- Understand the goal setting process

Estimated completion time (hours): 0.9

PFI-1003 BUDGETING

Course Description

One of the best ways to control how your money is spent is to create a budget. This course explores the budgeting process and methods for tracking your spending.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define disposable and discretionary income
- Define expenses
- Understand the budgeting process
- Describe zero-based budgeting
- Describe methods for tracking spending

Estimated completion time (hours): 0.9

PFI-1004 BANKING

Course Description

Banks and credit unions offer a wide variety of financial services. This course discusses many of the financial services that you will use.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a bank and a credit union
- Describe the financial services offered by banks and credit unions
- Describe the power of compound interest
- Explain the rule of 72

Estimated completion time (hours): 1.2

PFI-1005 CREDIT CARDS

Course Description

Credit cards are a convenient method of making purchases. Before going into debt with a credit card, you should know the ins and outs of how they work.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define credit cards
- Define revolving credit
- Understand how point-of-sale transactions work
- Describe how a credit card issuer makes money
- Define interest

Estimated completion time (hours): 1.0

PFI-1006 LOANS

Course Description

At some point in your life, you will probably take out a loan to pay for college, buy a car, or make another purchase. This course describes different types of loans and defines terminology associated with loans.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define terms associated with loans, including principal, interest, and term
- Describe a student loan
- Describe an automobile loan
- Describe a mortgage
- List what is typically included in a mortgage payment
- List different types of mortgages

Estimated completion time (hours): 1.1

PFI-1007 CREDIT REPORTS AND CREDIT SCORES

Course Description

When you apply for credit, a potential lender uses your credit reports and credit scores to help determine whether to approve your application. Because your credit reports and credit scores are used frequently, it is essential you understand them.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the three main credit bureaus
- Describe who uses your credit history
- Describe credit reports
- Describe credit scores
- Define identity theft
- List steps for responding to identity theft

Estimated completion time (hours): 0.9

PFI-1008 RETIREMENT PLANNING

Course Description

One financial goal that everyone should work toward is having a financially secure retirement. This course covers options for retirement planning.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the benefits of compound interest
- Describe 401(k) plans
- Describe a traditional IRA
- Describe a Roth IRA
- Describe small business retirement plans
- Understand the purpose of Social Security

Estimated completion time (hours): 1.1

PFI-1009 INVESTING

Course Description

Prudent investing can help you build wealth. This course introduces options for investing.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe money market instruments, bonds, and stocks
- Describe mutual funds
- Define risk tolerance
- Define asset allocation
- Explain how inflation impacts your purchasing power

Estimated completion time (hours): 1.3

PFI-1010 INSURANCE

Course Description

Insurance can protect you from the financial impact of unexpected occurrences, such as accidents or illnesses. This course describes the various types of insurance that are available.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define insurance terminology
- Describe health insurance
- Describe disability insurance
- Describe renter's insurance
- Describe homeowner's insurance
- Describe umbrella liability insurance
- Describe life insurance

Estimated completion time (hours): 1.0

PFI-1011 TAXES

Course Description

Taxes are collected by the federal, state, and local government to pay for road repairs, schools, and other services. This course discusses the various taxes you pay.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define Social Security and Medicare taxes
- Describe property taxes
- Describe sales taxes
- Describe capital gains taxes
- Describe income taxes
- Define marginal tax rate and effective tax rate

Estimated completion time (hours): 1.1

PFI-1012 ESTATE PLANNING

Course Description

No one likes to think about becoming incapacitated or dying, but it is important to plan ahead in case the worst happens. This course discusses estate planning tasks.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a will
- Describe probate
- Understand beneficiaries
- Define trusts
- Describe durable powers of attorney for finances and healthcare

Estimated completion time (hours): 0.8

PFI-1013 RECORD KEEPING

Course Description

You will have many paper and electronic records for your personal financial transactions. Knowing what to keep, and for how long, will help you organize your files.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the need for paper and electronic filing systems
- List how long to keep tax returns and related documents
- List how long to keep investment documents
- List how long to keep loan documents
- List how long to keep estate planning documents
- List how long to keep home ownership records
- List how long to keep vehicle documents
- List how long to keep passports

Estimated completion time (hours): 0.9

STUDY SKILLS COURSES

LEARNING ONLINE

STU-1004 TIPS FOR SUCCEEDING IN ONLINE LEARNING

Course Description

An online course is a great way to learn, but it is different from taking a class in a classroom. This course provides tips to help you succeed in an online learning environment.

Learning Objectives

By the end of this course, you will be able to do the following:

- Set a study schedule
- List tips for retaining the information you have studied
- List tips for taking quizzes

Estimated completion time (hours): 0.8

TEAM BUILDING COURSES

GROUP DYNAMICS

TEA-1001 WORKING IN A GROUP

Course Description

No matter how responsible, organized, or charismatic you are, if you don't work well with others, you won't have success - on or off the job. In this course, you'll learn about the advantages of working with other individuals. You'll also discover the science of group dynamics, as well as the difference between primary and secondary groups. Finally, you'll find out about the formal and informal roles group members may take on.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the importance of working well with others
- Define a group
- List the advantages of group work
- Define group dynamics
- Describe the characteristics of a group system
- Describe the difference between primary and secondary groups
- Describe the difference between formal and informal group roles

Estimated completion time (hours): 0.7

TEA-1002 GROUP COMMUNICATION

Course Description

Group members need to communicate effectively and collaboratively in order to accomplish the group's common goal. In this course, you'll learn how to communicate with group members so that what you're saying is correctly understood. You'll learn how to avoid common listening traps. You'll also discover how to listen for understanding.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the importance of effective communication
- List guidelines for effective communication
- Describe how to avoid sending mixed messages
- Identify common listening traps
- Understand how to listen for understanding

Estimated completion time (hours): 0.9

TEA-1003 EFFECTIVE COLLABORATION

Course Description

For a group to successfully collaborate to accomplish its goal, members must be able to get along and work together. In this course, you'll discover how trust, cohesiveness, support, and ethics affect group climate. You'll also learn how to become a better and more effective group member.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the difference between a positive and negative group climate
- List factors that affect group climate
- Understand your role in becoming a better group member
- Understand the importance of being cooperative and assertive
- List guidelines for effective group discussion

Estimated completion time (hours): 0.8

TEA-1004 LIFE STAGES OF A TEAM

Course Description

While not all groups are considered teams, all teams are considered groups. For a team to succeed, it's important that its members work together as a unit. In this course, you'll learn about the different life stages of a team. You'll also find out what you can do to help encourage team cohesiveness.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define team
- Describe the four life stages of a team
- Understand the reasons teams may struggle
- Define synergy
- List ways to build a cohesive team
- Understand how to set ground rules
- List ways to encourage teamwork

Estimated completion time (hours): 0.9

TEA-1005 MEETINGS

Course Description

Nothing destroys productivity and teamwork like a meeting gone bad. In this course, you'll discover when you really need to attend a meeting and what you can do to get the most out of the meeting.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe why it's important to get the most out of the time spent in meetings
- List common reasons why meetings are disliked
- Identify when a meeting is not necessary
- List times when a meeting should be held
- Describe what you need to do to conduct an effective meeting
- List what you need to do to prepare for a meeting
- Understand the importance of an agenda
- List the topics ground rules need to cover
- Understand what you need to do when you're the one leading the meeting
- Describe how to handle difficult personalities
- Understand how you can overcome your own anxiety in a meeting

Estimated completion time (hours): 0.8

TEA-1006 DIVERSITY

Course Description

Everyone is different, and not everyone in a group is going to think the same way or come from the same background. In this course, you'll learn guidelines for working in a diverse group.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand why being different from you isn't a negative
- List ways to respect diversity
- Define culture
- List the advantages of diversity
- List the disadvantages of diversity
- List strategies for working in a diverse group
- Describe ways to overcome language barriers

Estimated completion time (hours): 0.9

TEA-1007 CREATIVITY

Course Description

Creativity allows people to invent, communicate, and problem-solve at a higher level. In this course, you’ll learn about two tools that can help spark creativity: brainstorming and mind-mapping.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define creativity
- List ways to increase creativity
- Describe the process of brainstorming
- Describe the process of mind-mapping
- Understand how to piggyback on an idea

Estimated completion time (hours): 0.8

TEA-1008 PROBLEM-SOLVING

Course Description

Problems are a part of everyday life, so it shouldn’t surprise you when your group encounters one. In this course, you’ll learn how to deal with problems whenever they come your way.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the effects of unsolved problems
- Describe common problem-solving pitfalls
- Learn problem-solving techniques
- List common spelling errors
- Understand how to use the IDEA method to solve problems
- Describe how to use the S-T-P model of problem-solving
- Understand how to choose the right solution

Estimated completion time (hours): 1.0

TEA-1009 DECISION-MAKING

Course Description

Group decision-making is hard. In this course, you’ll discover the special considerations you need to think about during group decision-making. You’ll find out about what consensus really is and which traps you need to avoid. Finally, you’ll learn about groupthink and how you can prevent it.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand why group decision-making is difficult
- List the advantages and disadvantages of group decision-making
- Describe different decision-making approaches
- Identify common mistakes in reaching consensus
- Describe how to reach a true consensus
- Define groupthink
- Identify the signs of groupthink
- Understand the reasons for bad decision-making
- Describe the process for making good decisions
- Understand how to make an ethical decision

Estimated completion time (hours): 1.0

TEA-1010 CONFLICT MANAGEMENT

Course Description

In this course, you’ll find out why conflict occurs. You’ll learn how to identify the differences between positive and negative conflict as well as the common strategies for handling a conflict. You’ll also discover the six steps involved in successful collaboration. Finally, you’ll find out what you can do to help resolve group conflict.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the reasons why conflicts occur
- Describe the differences between positive and negative conflict
- Identify negative behavior
- List the effects of negative conflict
- Decide if and when to address conflict
- Understand the importance of listening in conflict resolution
- Implement conflict resolution strategies
- Engage in successful collaboration
- Describe what you can do to help resolve conflict

Estimated completion time (hours): 1.4

TEA-1011 LEADERSHIP

Course Description

Leaders have a tremendous impact on a group’s success in reaching its goals. In this course, you’ll discover what leadership is, as well as the traits of successful leaders. You’ll also learn how you can develop leadership skills in case you ever find yourself in a leadership position.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the role of a leader
- Explain why leadership is important
- List ways to develop leadership skills
- Explain the importance of communication in leadership
- Identify the traits of successful leaders
- Understand how to create a plan and set goals

Estimated completion time (hours): 0.8

TEA-1012 VIRTUAL GROUPS

Course Description

Virtual groups rely on technology to allow people in multiple locations and time zones to communicate and collaborate. Virtual groups take advantage of a multitude of technologies, including emails, instant messaging, and teleconferences. In this course, you’ll discover what you need to do as a virtual group member.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe a virtual group
- List the different types of virtual communication
- Describe the different virtual communication tools
- Understand the challenges of virtual group communication
- List ways to get the most out of working in a virtual group
- List the advantages and disadvantages of virtual meetings
- Describe the guidelines for conducting virtual meetings
- Describe the guidelines for using different types of conferencing tools

Estimated completion time (hours): 1.0

BUILDING EFFECTIVE TEAMS

TEA-1013 TEAMWORK

Course Description

Teamwork is an action performed by a team toward a common cause or goal. Teamwork is a crucial part of any business.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the term team
- Define the term teamwork
- Describe the seven common elements of teams
- Identify the advantages of teams
- Describe functional teams
- List the aspects of winning teams

Estimated completion time (hours): 1.5

TEA-1014 TEAM BUILDING

Course Description

Team building refers to a varied assortment of actions used in all aspects of life for the purpose of improving a group’s performance.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define team building
- List the purposes of team building
- Identify the purpose of team building activities designed to build team purpose
- Identify the purpose of team building activities designed to improve group dynamics
- List the four common types of team building exercises

Estimated completion time (hours): 0.9

TEAMWORK AND TRAINING

TEA-1015 TEAM DEVELOPMENT

Course Description

In today’s workplace, employers depend on high performance teams to help them remain competitive. Teamwork has many benefits for employers and employees alike, but developing an efficient team takes time and hard work.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain how teamwork benefits an employer and employees
- Define four types of teams
- Describe the characteristics of a successful team
- Identify three basic team roles
- Describe the five stages of team development

Estimated completion time (hours): 1.2

TEA-1016 TEAM PROBLEM SOLVING

Course Description

Teamwork involves a lot of responsibility and cooperation. Team members need to be able to work efficiently and effectively in order to meet the expectations set for and by them.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe how to develop a SMART goal
- Identify the six steps of the problem solving process
- Define four decision making procedures
- Explain how to avoid and settle conflict

Estimated completion time (hours): 1.1

TEA-1017 TRAINING AND DEVELOPMENT

Course Description

Strong training and development programs benefit employers and employees alike. These programs may vary from company to company, but all function according to a similar set of guidelines and principles.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the worth of effective leaders and trainers
- Identify the steps involved in creating a training program
- Define different methods of training
- Describe the importance of training in the manufacturing industry

Estimated completion time (hours): 1.0

TIME MANAGEMENT COURSES

TIME MANAGEMENT

TIM-1001 MANAGING YOUR TIME

Course Description

Everyone makes choices about how they spend their time. While almost everyone feels like there’s not enough hours in the day, being busy and being productive are not the same thing. In this course, you’ll discover reasons for making wise time management choices.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the importance of time management
- Describe how being busy and getting things done are two different things
- Describe the difference between urgent and important tasks
- List reasons not to multitask
- List ways to effectively manage your time
- Describe what you need to do to be successful at time management

Estimated completion time (hours): 0.9

TIM-1002 IDENTIFYING YOUR LIFE GOALS

Course Description

If you’re wondering how to identify your life goals, then you’ve come to the right course. In this course, you’ll evaluate whether you’re currently spending your time on important or trivial tasks. You’ll also learn about the SMART method of goal-setting, as well as how to break down your goals into bite-sized chunks. Finally, you’ll discover tips that help you achieve your goals.

Learning Objectives

By the end of this course, you will be able to do the following:

- Evaluate which tasks you’re currently spending your time on
- Determine whether your attention is on important or trivial matters
- Explain how to create SMART goals
- Describe how to break down a big goal into smaller chunks
- Understand the importance of setting deadlines for your goals
- Describe ways that help you achieve your goals

Estimated completion time (hours): 0.9

TIM-1003 MAKING A LIST AND CHECKING IT TWICE

Course Description

Say good-bye to sticky notes, stacks, and disorganization forever. When you start using a to-do list, you will be amazed at how more efficient, productive, and organized you are. In this course, you’ll learn about how to create several different types of to-do lists.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand why you need a list to effectively manage your time and priorities
- Describe options for creating a list
- Understand how to create a list
- Describe how to use different types of lists

Estimated completion time (hours): 0.8

TIM-1004 PLANNING YOUR DAY

Course Description

If you want to succeed at time management, you need to plan. Deciding what you will do each day and when will launch you on the road to success. In this course, you’ll discover tips for planning your priorities on a daily basis.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the benefits of planning
- Learn which type of planning systems works best for you
- Discover how to use a planner
- Understand the 80/20 rule
- Describe how to determine your priority tasks
- Describe how to create a daily plan

Estimated completion time (hours): 1.0

TIM-1005 ADOPTING TIMESAVING STRATEGIES

Course Description

Everyone has the same number of hours in a day, yet some people are able to accomplish so much more in that time. If you find yourself struggling to keep up with your never-ending to-do list, then take advantage of the timesaving strategies outlined in this course.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe timesaving strategies
- Understand why you need to say no more often
- List ways to help you stay focused on what you’re doing
- Understand how to delegate the right way
- Describe strategies for scheduling downtime

Estimated completion time (hours): 0.8

TIM-1006 GETTING ORGANIZED

Course Description

Managing your time well isn’t just about keeping track of your schedule and projects. It’s also about being organized. If you can’t find your keys, your other shoe, or your important paperwork, then how are you going to get anywhere on time – let alone manage a project? In this course, you’ll discover ways to organize your house, desk, and paperwork so that you can find anything you need at a moment’s notice.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify ways to declutter your home
- Describe the process for sorting items
- List ways to organize your desk
- Understand how to keep track of paper
- Describe the importance of organizing your thoughts
- List ways to stay organized at the end of the day

Estimated completion time (hours): 0.8

TIM-1007 ENDING PROCRASTINATION

Course Description

If you're putting off something for later that you can do today, chances are you're procrastinating. In this course, you'll discover what procrastination is and the ways that you can overcome it (starting now!).

Learning Objectives

By the end of this course, you will be able to do the following:

- Define procrastination
- Identify the signs of procrastination
- Recognize the excuses for procrastination
- List ways to overcome procrastination

Estimated completion time (hours): 0.8

TIM-1008 TAKING ADVANTAGE OF TECHNOLOGY

Course Description

Technology can be a real timesaver when used responsibly. In this course, you'll learn how to get the most out of technology without it taking over your life.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the importance of using technology responsibly
- Overcome the need to be in constant contact
- List ways to manage technology
- Describe how to keep email under control
- List ways to get the most out of phone communication
- Understand what the cloud is and how it works
- Describe why you need to keep up with emerging technology

Estimated completion time (hours): 1.0

TIM-1009 WHEN TIME GETS THE BEST OF YOU: DEALING WITH STRESS

Course Description

Many people feel overwhelmed and let stress get the best of them. In this course, you'll discover how to combat the stress in your life in positive ways.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define stress
- Understand the effects of stress
- Recognize the causes of stress
- Determine your stress levels
- List positive ways to deal with stress

Estimated completion time (hours): 0.9

HEALTH & SAFETY SKILLS COURSES

INTRODUCTION TO SAFETY

SAF-1001 INTRODUCTION TO OSHA

Course Description

Before the 1970s, workplace accidents were common. The OSH Act was the first national standard to address workplace health and safety. This act created the Occupational Safety and Health Administration (OSHA), an organization that guarantees the rights of employees to a safe workplace.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe OSHA's role in workplace safety
- Know who OSHA does and does not cover
- List employee and employer rights under OSHA
- Understand what an OSHA standard is

Estimated completion time (hours): 1.1

SAF-1002 MAKING WORK A SAFER PLACE

Course Description

Conducting a thorough job hazard analysis can make work a much safer place for employees. OSHA inspections also help prevent dangers and protect workers. However, workplace safety isn't only affected by on-the-job hazards. Employee behavior plays a huge role as well.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the job hazard analysis process
- Know each step of an OSHA inspection
- Identify the different types of citations and penalties
- Know where to find more safety information
- Recognize guidelines for preventing workplace violence
- Spot substance abuse issues

Estimated completion time (hours): 1.6

SAF-1003 HELP! WHAT TO DO IN AN EMERGENCY

Course Description

Emergencies are never expected, and chaos can quickly ensue. That's why it's important to establish an emergency action plan before a crisis occurs. When an emergency does happen, someone needs to be available to administer first aid. Employees also need to know how to prevent exposure to blood borne pathogens.

Learning Objectives

By the end of this course, you will be able to do the following:

- Develop an emergency action plan
- Know where to find first-aid training
- Control your exposure to blood borne pathogens

Estimated completion time (hours): 1.2

PERSONAL PROTECTIVE EQUIPMENT SAFETY
SAF-1004 PERSONAL PROTECTIVE EQUIPMENT

Course Description
Personal protective equipment (PPE) plays an important role in worker safety. Worn properly, personal protective equipment can minimize your exposure to many workplace hazards.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Apply the Hierarchy of Controls
 - Understand both employer and employee responsibilities
 - Conduct a hazard assessment
 - Identify the different types of personal protective equipment

Estimated completion time (hours): 1.5

SAF-1005 EYE AND FACE PROTECTION

Course Description
Many workplace injuries are the result of eye and face hazards. Flying shards, chemicals, and bright light are just a few examples of workplace hazards that can cause injury.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Recognize potential eye and face hazards
 - Understand employer responsibilities
 - Explain common types of eye and face protection
 - Follow guidelines to protect your eyes and face

Estimated completion time (hours): 1.0

SAF-1006 HEAD PROTECTION

Course Description
Head injuries aren't to be taken lightly. Their effects can haunt you for the rest of your life and may even be fatal. Fortunately, proper hard hats can protect you from many types of head hazards.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify types of head hazards
 - Know the guidelines to protect your head
 - Choose the appropriate hard hat

Estimated completion time (hours): 0.9

SAF-1007 FOOT AND LEG PROTECTION

Course Description
Foot and leg injuries are very common in manufacturing, but you can take advantage of PPE to minimize your exposure to workplace hazards. Foot and leg PPE, such as safety shoes and toe guards, can help protect you from workplace hazards.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify types of foot hazards
 - Follow guidelines to protect your feet
 - Match your shoe protection to the hazard

Estimated completion time (hours): 0.9

SAF-1008 HAND AND ARM PROTECTION

Course Description
If workers face potential injury to their hands and employers can't eliminate the workplace hazard through engineering and work practice controls, then employees need to wear PPE. PPE, such as arm coverings and gloves, help protect workers' hands from chemicals and other workplace hazards.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify types of hand hazards
 - Know the guidelines for protecting your hands
 - Be familiar with different types of hand PPE

Estimated completion time (hours): 1.1

SAF-1009 BODY PROTECTION

Course Description
Protective clothing can help keep you safe from workplace hazards that can cause bodily injury while performing your job.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Be aware of body hazards
 - Identify the types of protective clothing for your body
 - Follow safety guidelines for wearing clothing in the workplace

Estimated completion time (hours): 0.8

SAF-1010 HEARING PROTECTION

Course Description
Loud noises can cause permanent hearing damage, as well as physical and psychological stress. As a result, whenever you risk exposure to excessive levels of noise, you need to wear proper PPE to protect your hearing.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Recognize the need for hearing protection
 - Follow guidelines to reduce the amount of noise exposure
 - Choose appropriate hearing PPE
 - Know how to use hearing PPE

Estimated completion time (hours): 0.9

SAF-1011 RESPIRATORY PROTECTION

Course Description
Breathing air contaminated with workplace hazards can cause injury and illness. Respiratory equipment helps filter and purify air so that you can breathe clean air.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Recognize respiratory hazards
 - Identify the different types of respiratory equipment
 - Follow the guidelines for respiratory protection

Estimated completion time (hours): 1.2

HAZARDOUS MATERIAL SAFETY
SAF-1012 HAZARDOUS MATERIALS

Course Description
Hazardous materials are present in many forms in the manufacturing workplace. The first step to protect yourself is to recognize the chemicals that create potential hazards in your work environment.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Describe what a hazardous material is and why it’s important
 - Identify the different forms of toxic materials
 - Recognize the entry routes of hazardous materials

Estimated completion time (hours): 1.5

SAF-1013 HAZCOM
Course Description

In 2012, OSHA updated its Hazard Communication Standard (HazCom) to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). In HazCom 2012, a material safety data sheet (MSDS) is simply a safety data sheet, and labels now have a consistent look, complete with pictograms.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify the major changes to the HazCom
 - Understand the new label requirements
 - Explain each section of the new safety data sheet
 - Know what your employer’s responsibilities are

Estimated completion time (hours): 1.4

SAF-1014 HAZARDOUS WASTE
Course Description

Improper dumping of hazardous waste is a serious issue. OSHA’s Hazardous Waste Operations and Emergency Response (HAZWOPER) standard outlines how to handle hazardous waste operations and emergency response.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define hazardous waste
 - Describe the requirements of HAZWOPER
 - Explain what an emergency response plan covers

Estimated completion time (hours): 0.7

SAF-1015 HAZARD MATERIAL STORAGE
Course Description

Proper storage of hazardous materials is critical to the safety of everyone. Improperly stored hazardous materials could lead to serious injury or even death.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define hazardous material
 - Understand the terms flash point and boiling point of liquids
 - Distinguish between flammable and combustible liquids
 - List methods of storing hazardous materials.
 - List common requirements of hazardous material storage rooms
 - List common requirements of hazardous material storage cabinets

Estimated completion time (hours): 0.8

WORKPLACE SAFETY
SAF-1016 WORK AREA SAFETY

Course Description
Work area safety can be greatly improved by paying attention to little things that may be overlooked. A clean, organized work area, wide, clear walkways, and proper lifting techniques go a long way toward keeping you safe on the job.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Understand the importance of housekeeping
 - Identify walkways and exits
 - Create an ergonomic work environment
 - Maintain a correct, neutral posture
 - Use proper lifting techniques

Estimated completion time (hours): 1.2

SAF-1017 PERMIT-RELATED SAFETY
Course Description

Confined spaces present some unique hazards that you normally wouldn’t encounter in an open workplace. As a result, some confined spaces require that workers have permits to work in them. However, an entry permit doesn’t make unsafe work safe.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Describe a confined space
 - Recognize hazards in a confined space
 - Follow guidelines for working in a permit space
 - Understand the importance of an entry permit
 - Identify the types of entry permits

Estimated completion time (hours): 1.0

SAF-1018 FALL PREVENTION
Course Description

Falls are one of the most common causes of workplace injuries and fatalities. Employers can reduce the risk of falling from elevated surfaces by providing fall protection equipment. In addition, you, as an employee, can minimize the risk of falling by following simple safety guidelines.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Know the steps employers must take to prevent falls
 - Identify fall protection systems
 - Follow safety guidelines for scaffold work
 - Stay safe when working on an aerial lift

Estimated completion time (hours): 1.3

SAF-1019 LADDER SAFETY

Course Description

Many types of ladders are available. Because you run the risk of falling any time you’re working at an elevated height, it’s important to choose the correct ladder for the job. You also need to follow ladder safety guidelines to reduce your risk of injury.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the different types of ladders
- Follow ladder safety guidelines
- Inspect a ladder
- Climb a ladder using three-point contact
- Set up a ladder correctly

Estimated completion time (hours): 1.1

ELECTRICAL AND FIRE SAFETY

SAF-1020 ELECTRICAL SAFETY

Course Description

Working with electricity can be dangerous, whether you’re working with it directly or indirectly. However, with a healthy respect for electricity and a basic understanding of how it works, you can take precautions to protect yourself from electrical hazards.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand how electricity works
- Identify electrical hazards
- Apply electrical safety guidelines

Estimated completion time (hours): 1.4

SAF-1021 LOCKOUT/TAGOUT

Course Description

If a device starts up unexpectedly, you can be severely injured. Fortunately, lockout/tagout procedures prevent devices from accidentally starting up. As long as the processes are followed correctly, lockout/tagout procedures play a valuable role in protecting you from workplace hazards.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the lockout/tagout process
- Identify the main components of an electrical and a pneumatic lockout/tagout
- Follow the steps to perform an electrical lockout/tagout
- Complete a pneumatic lockout/tagout

Estimated completion time (hours): 1.0

SAF-1022 FIRE SAFETY

Course Description

A workplace fire can have nightmarish consequences. To avoid tragic results, employers need to train their employees on fire hazards in the workplace and what to do in case a fire does occur.

Learning Objectives

By the end of this course, you will be able to do the following:

- Know how a fire starts
- Explain the difference between the classes of fire
- Apply fire safety guidelines
- Practice a fire drill

Estimated completion time (hours): 0.9

SAF-1023 FIRE EXTINGUISHERS

Course Description

Selecting the wrong type of fire extinguisher for a fire or using it incorrectly can make a bad situation worse. Using a fire extinguisher isn’t just about picking up the nearest one and using it to fight a fire. Selecting the right fire extinguisher for the fire and following the PASS sequence can make a big difference in your firefighting success.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand how a fire extinguisher works
- Match a fire extinguisher to a class of fire
- Use a fire extinguisher

Estimated completion time (hours): 0.9

MATERIAL HANDLING SAFETY
SAF-1024 MATERIAL HANDLING BASICS

Course Description

Material handling plays an important role in today’s workplace. It involves moving physical objects from one location to another. However, handling and storing materials isn’t without risk. In fact, mishandling materials is the single largest cause of accidents and injuries in the workplace. Recognizing potential hazards and following basic safety precautions can help reduce the likelihood of injuries or fatalities.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify potential hazards
- Follow guidelines to safely move materials
- Stack and store materials

Estimated completion time (hours): 1.0

SAF-1025 POWERED INDUSTRIAL TRUCKS

Course Description

At times, employees will need to move materials mechanically. To reduce the number of accidents associated with workplace equipment, employers must train employees on how to safely and effectively use this equipment. In this course, you will discover how you can safely use conveyors and powered industrial trucks to move and store materials.

Learning Objectives

By the end of this course, you will be able to do the following:

- Safely move material using conveyors
- Identify the different classes of powered industrial trucks
- Recognize the hazards associated with forklifts
- Know how to safely operate forklifts and powered industrial trucks

Estimated completion time (hours): 0.9

SAF-1026 CRANE AND RIGGING SAFETY

Course Description

Cranes can help you lift, lower, and move heavy loads. Although cranes are a great help when moving materials mechanically, they also come with their own set of safety hazards. In this course, you will discover how to safely use cranes and slings to move and store materials.

Learning Objectives

By the end of this course, you will be able to do the following:

- Follow safety guidelines to operate a crane
- Use rigging equipment to lift a load
- Identify common sling configurations
- Properly care for and use slings

Estimated completion time (hours): 1.3

TOOL AND MACHINE SAFETY

SAF-1027 HAND TOOL SAFETY

Course Description

No matter which manufacturing subindustry you work in, more than likely your job involves working with tools. Whenever you work with hand and cutting tools, you need to follow certain safety guidelines to avoid workplace accidents.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify tool hazards
- Explain hand tool safety guidelines
- Follow cutting tool safety guidelines
- Maintain hand tools

Estimated completion time (hours): 1.0

SAF-1028 POWER TOOL SAFETY

Course Description

Power tools require a few more safety precautions than hand tools. Following additional guidelines when working with all types of power tools goes a long way toward keeping you safe in the workplace.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand how guards and safety devices work
- Identify power tool hazards
- Explain power tool safety guidelines
- Protect yourself while working with electric tools
- Follow pneumatic tool safety guidelines

Estimated completion time (hours): 1.1

SAF-1029 SHEET METAL AND COMPRESSED GAS SAFETY

Course Description

Working with sheet metal can be dangerous due to the nature of the material. Welding and cutting sheet metal involves using compressed gases to produce a high temperature flame. In this course, you will discover everything you need to know to safely work with sheet metal and compressed gases.

Learning Objectives

By the end of this course, you will be able to do the following:

- Know sheet metal safety guidelines
- Follow safety guidelines to store, use, and transport compressed gas cylinders

Estimated completion time (hours): 0.8

SAF-1030 MACHINE SAFETY

Course Description

Whenever you use machines, you risk machinery-related injuries, such as crushed hands, severed limbs, and blindness. However, you can follow safety guidelines and use machine guards to help protect yourself from dangerous machine motions and action.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe clothing safety guidelines
- Follow machine operation safety guidelines
- Identify hazardous mechanical motions and actions
- Understand the requirements for safeguards

Estimated completion time (hours): 1.3

SAF-1031 SAFETY DEVICES

Course Description

Different types of safety devices help prevent injury while operating a machine. Each type of safety device plays a special role in keeping you safe, whether it's by stopping the machine or preventing your hands from reaching into a certain area while the machine is operating.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the general types of safety devices
- Recognize the limitations of each type of safety device
- Understand how an emergency stop device works

Estimated completion time (hours): 1.0

LEAN MANUFACTURING COURSES

LEAN PRINCIPLES

LEA-1001 LEAN PRINCIPLES

Course Description

Lean principles are designed to help an organization achieve process perfection. The foundation of lean principles are employee involvement, adding the maximum value, and the elimination of waste. Lean is a journey toward understanding the customer and their needs.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define and describe the concepts of lean, including pull and perfection
- Define and describe the elimination of waste using tools like 5S, kaizen, and poke-yoke
- Use a value stream map to identify waste
- Explain value
- Define value, value-added, and non-value-added
- Identify the terms used to describe waste
- Describe the theory of constraints

Estimated completion time (hours): 1.5

INTRODUCTION TO LEAN MANUFACTURING

LEA-1002 THE HISTORY OF LEAN MANUFACTURING

Course Description

In this course, you'll learn about the history of lean manufacturing. You'll discover how the contributions of Henry Ford, Taiichi Ohno, and Shigeo Shingo worked together to form what is today called lean manufacturing. You'll also find out about the three essential elements of the Toyota Production System.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the major contributions in the history of lean manufacturing
- Identify the principles and practices of using lean manufacturing
- Name the three essential elements of the Toyota Production System

Estimated completion time (hours): 0.9

WORKPLACE ORGANIZATION

LEA-1003 WORKPLACE ORGANIZATION

Course Description

A disorganized work area not only makes it hard to find items, but it makes working effectively and efficiently difficult as well. In this course, you'll learn about the importance of workplace organization, the methods used to organize the workplace, and the 5S program.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the principles of workplace organization
- Identify the methods used to organize the workplace
- Recognize the methods used to measure workplace organization

Estimated completion time (hours): 1.1

LEA-1004 S1: SORT

Course Description

In this course, you'll learn about the process of Sort. Sort involves getting rid of unnecessary items and general clutter in the work area. Sort helps ensure that only necessary items remain in the workplace.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the 5S meaning of Sort
- Match Sort with its requirements and compliance activity
- Identify key actions for Sort
- Explain how Sort is executed in the workplace

Estimated completion time (hours): 0.7

LEA-1005 S2: STRAIGHTEN

Course Description

In this course, you will learn about Straighten. Straighten is a method for organizing the workplace to reduce wasted steps, motion, and time. You'll explore techniques designed to help you store tools where they're needed and visually obvious. You'll also learn to use outlines and labels to identify the location of machines, walkways, and storage areas.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the 5S meaning of Straighten
- Match Straighten with its requirements and compliance activity
- Identify key actions for Straighten
- Explain how Straighten is executed in the workplace

Estimated completion time (hours): 0.9

LEA-1006 S3: SHINE

Course Description

In this course, you will learn to Shine. Shine is maintaining order through cleaning. Daily cleaning routines are established to maintain a clean and tidy working environment. You'll explore steps for keeping equipment clean and in good working order.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the 5S meaning of Shine
- Match Shine with its requirements and compliance activity
- Identify key actions for Shine
- Explain how Shine is executed in the workplace

Estimated completion time (hours): 0.8

LEA-1007 S4: STANDARDIZE

Course Description

In this course, you will learn about standardizing the Sort, Straighten, and Shine activities. You'll also discover basic guidance on how to keep the 5S effort active in your organization.

Learning Objectives

By the end of this course, you will be able to do the following:

- Match Standardize with its requirements and compliance activity
- Identify the key actions for Standardize
- Explain how Standardize is executed in the workplace

Estimated completion time (hours): 0.7

LEA-1008 S5: SUSTAIN

Course Description

The last step of 5S, Sustain, is considered the most difficult step of the 5S process. Sustain is defined as the training and discipline needed to maintain 5S. In this course, you'll learn why sustaining the 5S effort takes so much work and commitment by everyone.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand Sustain requirements and compliance activity
- Identify the key action steps for Sustain
- Explain how Sustain is executed in the workplace

Estimated completion time (hours): 0.7

QUALITY COURSES

QUALITY SYSTEMS

QUA-1001 INTRODUCTION TO QUALITY

Course Description

Quality is a term that's mentioned often, but what does it really mean? This course defines terms, like quality and Total Quality Management (TQM), and how these terms apply to manufacturing companies.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define quality, customer, and expectations
- Identify the source of expectations
- Define quality management systems
- Describe the history of quality management systems
- Define Total Quality Management (TQM)
- List the principles of TQM
- Identify who is involved in quality
- Give examples of how customers and companies benefit from quality systems

Estimated completion time (hours): 1.4

QUA-1002 ISO 9000

Course Description

International standards are a way of overcoming technical barriers to global trade. The most prominent organization that develops these standards is the International Organization for Standardization (ISO).

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the International Organization for Standardization (ISO)
- Define ISO standard
- Describe the Plan, Do, Check, Act (PDCA) cycle as applied to ISO standards
- State the goals of ISO 9001:2000
- Describe some of the industries impacted by ISO standards

Estimated completion time (hours): 1.1

QUA-1003 STANDARDS ORGANIZATIONS

Course Description

Standards organizations develop, coordinate, distribute, revise, issue, interpret, and otherwise produce standards intended to address the needs of affected adopters.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define standards
- Define technical standards
- Define standards organizations
- Describe the uses of standards
- State the purpose of international standards

Estimated completion time (hours): 0.9

QUA-1004 QUALITY ORGANIZATIONS

Course Description

Implementing a quality system requires a support organization that spans the entire company. The organizational structure reflects the company structure and the requirements of the products being produced.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define quality organization
- Describe where a quality system comes from
- Identify the four levels of quality documentation
- Identify some typical parts of a quality organization
- Discuss the roles and the challenges quality organizations face
- Explain why quality personnel must be independent

Estimated completion time (hours): 0.9

QUA-1005 BASIC QUALITY ROLES AND RESPONSIBILITIES

Course Description

Quality assurance is a company-wide effort with responsibilities extending to every employee. Within a company’s quality program, there are a few basic roles with responsibilities that must be fulfilled.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define role
- Define responsibilities
- Define fulfillment of requirements
- Describe the roles and responsibilities of Quality Assurance personnel
- Define inspection
- Describe the inspection process

Estimated completion time (hours): 1.0

QUA-1006 QUALITY CONCEPTS

Course Description

Quality is based on the wants, needs, and expectations of the customer. In this course, you will be introduced to the concepts of product quality, the types of customers and how to meet their expectations.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define product quality
- Identify the difference between internal and external customers
- Define specification
- Define tolerance and explain its importance
- Identify the roles of management and production workers regarding quality
- Describe how quality teams work

Estimated completion time (hours): 0.9

QUA-1007 THE COST OF QUALITY

Course Description

Producing quality products costs money. Where the company spends money producing quality products is an indicator of their commitment to the customer and to the long-term sustainability of the company.

Learning Objectives

By the end of this course, you will be able to do the following::

- Define the cost of quality
- Categorize quality activities into one of the four classifications of quality
- Differentiate between prevention and appraisal costs
- Explain the difference between internal and external failure costs
- Describe the Six Sigma quality system

Estimated completion time (hours): 0.9

QUA-1008 MANAGING QUALITY

Course Description

Quality planning, quality control, and quality improvement are essential to the success of a quality program. Organizations that are serious about quality have robust quality management systems to ensure these activities are properly supported and implemented.

Learning Objectives

By the end of this course, you will be able to do the following::

- Define the three key elements of quality and explain how they are related
- Define quality planning
- Define quality control
- Define quality improvement
- Explain the impact of quality improvement on productivity
- Explain the importance of data collection and analysis to quality
- Describe quality audit

Estimated completion time (hours): 1.1

QUA-1009 QUALITY DOCUMENTS

Course Description

The heart of any quality system is documentation. Documents tell you how and when to perform tasks, and they also serve as a permanent record that the tasks were completed. In this course, you will learn the purpose and types of documentation used in a quality system.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the levels of documentation in a quality system
- Describe the purpose of a policy
- Describe the purpose of a procedure
- Describe the purpose of a work instruction
- Define document control
- Describe a technical manual
- Identify the benefits of electronic data interchange

Estimated completion time (hours): 0.9

QUA-1010 CORRECTIVE AND PREVENTIVE ACTION

Course Description

Corrective and preventive actions are designed to eliminate the causes of nonconformities. They are a requirement of ISO 9000 and many other quality systems.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the difference between corrective and preventive action
- List the steps of the corrective action process
- Explain the importance of the corrective action report
- Define the purpose of a Material Review Board

Estimated completion time (hours): 0.8

INTRODUCTION TO STATISTICAL PROCESS CONTROL

QUA-1011 INTRODUCTION TO SPC

Course Description

Statistical Process Control, or SPC, is a quality control methodology that uses statistics to predict variation in processes. Developed in the 1920s, SPC is widely used by manufacturing companies to maintain the quality of the products they produce.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define statistical process control
- Identify and explain the three basics of statistical process control
- Explain the types of variation that exist in a process
- Explain the history of statistical process control

Estimated completion time (hours): 1.0

QUA-1012 PROBABILITY AND VARIATION

Course Description

Probability and variations are the foundation of SPC. The mathematical rules of probability can help to accurately predict the variation in any process.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the different types of variation
- Define and explain the six common causes of variation
- Explain the principles of probability
- Calculate the probability of an event
- Construct a histogram
- Explain the concepts of standard deviation

Estimated completion time (hours): 1.8

QUA-1013 THE CONTROL CHART

Course Description

The control chart is a tool used in Statistical Process Control to determine if a manufacturing process is in a state of statistical control. Control charts achieve this by comparing real-time process information with historical process data.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the purpose of a control chart
- Explain the fields on a control chart
- Prepare a new control chart
- Calculate X-bar
- Calculate X-double bar
- Calculate R-bar

Estimated completion time (hours): 1.2

ADVANCED STATISTICAL PROCESS CONTROL

QUA-2001 CONTROL CHART ANALYSIS

Course Description

Analyzing the data on your control chart will help you keep your processes in a state of statistical control. This course provides a few rules and guidelines that will help you identify potential problems before the process creates defective products.

Learning Objectives

By the end of this course, you will be able to do the following:

- Prepare a control chart for analysis
- Explain the eight basic control chart tests
- Analyze the averages chart
- Analyze the range chart

Estimated completion time (hours): 0.9

QUA-2002 PROCESS CAPABILITY

Course Description

Process capability is a measure of the ability of a process to produce products that meet or exceed the engineering requirements. It is the standard for evaluating the statistical capability of a manufacturing process.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define process capability
- Define specification limits
- Calculate process capability
- Calculate the process capability index
- Explain how the location of the process mean impacts process capability

Estimated completion time (hours): 1.0

QUA-2003 PROBLEM SOLVING TOOLS

Course Description

Problem solving tools are used to identify the root causes of problems in a process. They are designed to create a methodical path towards problem resolution.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the seven quality control tools
- Define and explain the seven basic quality tools
- Create a cause-and-effect diagram
- Create a check sheet
- Create a histogram
- Create a pareto chart
- Create basic graphs

Estimated completion time (hours): 1.1

QUA-2004 PROBLEM SOLVING

Course Description

Problem solving is one of the most difficult things you will ever do. It requires a strong mind, willpower, and knowledge of problem solving processes to get to the root cause of difficult problems.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the Plan, Do, Check, Act cycle
- Define the required tasks for each step of the Plan, Do, Check, Act cycle
- Identify how the seven quality tools are used in the Plan, Do, Check, Act Cycle

Estimated completion time (hours): 0.9

SIX SIGMA COURSES

SIX SIGMA AND THE ORGANIZATION

SIX-3001 SIX SIGMA AND THE ORGANIZATION

Course Description

Six Sigma is the structured, disciplined pursuit of near perfection in the products or services an organization produces.

It is based on statistical techniques and tools, and attempts to improve an organization’s bottom line by eliminating the variation in business processes that can result in defects.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the origins of Six Sigma
- Recognize why organizations use Six Sigma
- Explain how they apply its philosophy and goals
- Describe how process inputs, outputs, and feedback impact the larger organization
- Recognize key drivers for business and how key metrics and scorecards are developed
- Describe the project selection process
- Explain when to use Six Sigma improvement methodology as opposed to other problem-solving tools
- Explain how a project supports and is linked to organizational goals

Estimated completion time (hours): 1.9

SIX-3003 DESIGN FOR SIX-SIGMA

Course Description

Design for Six Sigma (DFSS) is an application of Six Sigma that encompasses the product design and redesign processes. DFSS makes certain that the voice of the customer is built into every new product and service.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe how quality function deployment fits into the overall DFSS process
- Define the purpose of the QFD
- Create a QFD matrix
- Explain the purpose of process and design failure mode and effects analyses (PFMEA and DFMEA)
- Calculate the RPN value for a PFMEA and DFMEA
- Explain the differences between a PFMEA and a DFMEA

Estimated completion time (hours): 1.0

SIX SIGMA DEFINE

SIX-3004 PROCESS ELEMENTS FOR PROJECTS

Course Description

A Six Sigma project often requires a large amount of time from many people, and can be quite costly to the organization. The define portion of the DMAIC continuous improvement model provides the information and tools necessary to identify the issue causing decreased customer satisfaction, and to ensure the project will be a value-added activity.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define components of processes
- Define process boundaries
- Describe the difference between internal and external customers
- Define process owner
- Define process stakeholder
- List some means of identifying customers
- Identify means for collecting customer data

Estimated completion time (hours): 1.2

SIX-3005 PROJECT MANAGEMENT BASICS

Course Description

Basic project management techniques are key contributors to the success of a Six Sigma project. Creating a project charter and performing risk analysis during the define phase helps a Six Sigma project stay on target and addresses potential risks.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the contents of a project charter
- Define problem statement
- Define purpose
- Define benefits
- Define scope
- Define results
- State the benefit of project risk analysis

Estimated completion time (hours): 1.1

SIX-3006 MANAGEMENT AND PLANNING TOOLS

Course Description

The success of a Six Sigma project depends on accurately identifying the current state of a process, and then assessing the problems within the process. A number of management and planning tools are available for this purpose.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define affinity diagram
- Define interrelationship diagraph
- Define tree diagram
- Define prioritization matrix
- Define PDPC
- Define activity network diagram
- Define matrix diagram
- Identify types and uses of matrix diagrams

Estimated completion time (hours): 0.7

SIX-3007 BUSINESS RESULTS FOR IMPROVEMENT PROJECTS

Course Description

To complete the define phase of a Six Sigma project, it's necessary to be able to assess its performance. Business results are measurements of performance that can be applied to the business, project, or process.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define Defects per Unit (DPU)
- Define RolledThroughputYield (RTY)
- Define Defects per Million Opportunities (DPMO)
- Describe sigma level
- Describe process capability indices

Estimated completion time (hours): 1.1

SIX-3008 PROJECT TEAM DYNAMICS AND PERFORMANCE

Course Description

To be successful, a Six Sigma project must be executed by an effective team. Teams evolve over time, passing through definite phases of evolution until they find their place in the organization's Six Sigma structure.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define and describe the stages of team evolution
- List the different roles in a Six Sigma team
- Define brainstorming
- Define nominal group technique
- Define multivoting

Estimated completion time (hours): 1.3

SIX-3009 PROBLEM SOLVING TOOLS

Course Description

A wide variety of tools exist for use in the define phase of a Six Sigma project. Each tool can provide insight into an organization's processes and help with the development of a good project plan.

Learning Objectives

By the end of this course, you will be able to do the following: describe the following common define phase tools:

- Surveys
- Focus groups
- Interviews
- Audits
- Cause and effect diagrams
- Check sheets
- Graphical charts
- Sampling plans
- Advanced Quality Planning (AQP)
- Benchmarking
- Force field analysis
- Gantt charts
- Project Evaluation and ReviewTechnique (PERT)/Critical Path Method (CPM)

Estimated completion time (hours): 1.9

SIX SIGMA MEASURE

SIX-3010 PROCESS ANALYSIS AND DOCUMENTATION

Course Description

The measure portion of the DMAIC methodology provides a Six Sigma team with the tools needed to focus the project on possible causes of problems and solutions to those causes.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify and review process maps, written procedures, and work instructions
- Identify process input variables and process output variables
- Recognize the relationships between input variables and output variables

Estimated completion time (hours): 1.0

SIX-3011 PROBABILITY AND STATISTICS

Course Description

In today’s business world, companies cannot remain competitive if they must measure every product’s weight, color, size, strength, and any other characteristic 100 percent. Organizations use probability and statistics to measure samples of a product and provide mathematical proof of the quality of the product or process.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define probability
- Describe and apply probability concepts
- Define statistics
- List statistical parameters
- Distinguish between descriptive and inferential statistics
- Distinguish between a population parameter and a sample statistic
- Define a central limit theorem and its significance in statistics

Estimated completion time (hours): 2.1

SIX-3012 COLLECTING AND SUMMARIZING DATA

Course Description

To improve a process or product it is important to know its current status and its status after improvements are made. Valid data must be collected and summarized to verify the status of the process or product.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify continuous or variable data
- Identify discrete or attribute data
- Describe and define nominal, ordinal, interval, and ratio measurement scales
- Define and apply methods for collecting data
- Define and apply techniques such as random sampling, stratified sampling, and sample homogeneity
- Depict relationships by constructing, applying, and interpreting diagrams and charts

Estimated completion time (hours): 1.7

SIX-3013 PROBABILITY DISTRIBUTIONS

Course Description

A random experiment or sample can result in different outcomes.The probability that each outcome will occur can be calculated and charted using different probability distributions.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe and interpret normal, binomial, Poisson, t, chi square, and F distributions
- Identify formulas for calculating the probability of data values of different probability distributions

Estimated completion time (hours): 2.2

SIX-3014 MEASUREMENT SYSTEM ANALYSIS

Course Description

Data often consists of measurements of characteristics or conditions. A measurement system analysis is necessary to identify measurement variation and distinguish between measurement and process variation.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define measurement system analysis
- Identify and conduct gauge repeatability and reproducibility studies
- Define measurement terms including sensitivity, accuracy, precision, bias, and linearity

Estimated completion time (hours): 2.5

SIX-3015 PROCESS CAPABILITY PERFORMANCE

Course Description

A main goal of a Six Sigma project is to reduce variation in a process.To meet this goal, the Six Sigma team must know the capability and performance of the process before and after improvements are implemented.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the process of conducting a process capability study
- Distinguish between natural process limits and specification limits
- Define and calculate process capability indices
- Define and calculate process performance indices
- Describe the differences between short-term and long-term capability

Estimated completion time (hours): 1.9

SIX SIGMA ANALYZE
SIX-3016 EXPLORATORY DATA ANALYSIS

Course Description

Before any problem can be eliminated or controlled, the cause of the problem must be identified and confirmed. Six Sigma teams use statistical tools to perform an analysis of data to identify and confirm the variable that causes most variation in a process or product.

Learning Objectives

By the end of this course, you will be able to do the following:

- Create and interpret multi-vari studies
- Identify the differences between positional, cyclical, and temporal variations
- Identify the largest source of variation in a process using a multi-vari study
- Interpret the linear correlation coefficient
- Determine the statistical significance of a linear correlation coefficient
- Identify the equation for linear regression

Estimated completion time (hours): 1.9

SIX-3017 HYPOTHESESTEST BASICS

Course Description

Hypotheses tests are statistical methods of making decisions on the results of a study to determine if the results are truly related, or if they occur by chance. Hypotheses tests differ in the results they produce and what information is required, but they all share some basic terms and concepts.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define and distinguish between statistical significance and practical significance
- Apply tests for significance level, power, and type I and type II errors
- Define null and alternative hypotheses
- List acceptable null and alternative hypotheses for statistical parameters
- Determine appropriate sample size for various tests
- Define confidence levels and confidence intervals
- Calculate confidence intervals for population parameters

Estimated completion time (hours): 1.5

SIX-3018 HYPOTHESES TESTS

Course Description

Six Sigma teams must understand the difference between the types of hypotheses tests to determine the proper test for the problem. Selection of the proper test is determined by the statistical parameter to be tested and the available information from the sample data.

Learning Objectives

By the end of this course, you will be able to do the following:

- List common hypotheses tests
- Define and describe paired-comparison hypotheses tests
- Define terms related to one-way ANOVAs and interpret their results and data plots
- Define and interpret chi-square and use it to determine statistical significance

Estimated completion time (hours): 2.7

SIX SIGMA IMPROVE AND CONTROL

SIX-3019 DESIGN OF EXPERIMENTS

Course Description

Properly designed experiments are essential to improving a Six Sigma project and making the project successful.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define terms associated with the design of experiments
- Interpret main effects of a factor
- Interpret interaction plots

Estimated completion time (hours): 1.3

SIX-3020 SPC

Course Description

Statistical Process Control, or SPC, is a quality control methodology that uses statistics to predict variation in processes. SPC is the basis for the control portion of a Six Sigma project.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define statistical process control
- Define and describe the objectives and benefits of statistical process control
- Explain the types of variation that exist in a process
- Define and describe how rational subgrouping is used
- Identify, select, construct, and apply various control charts
- Interpret various control charts

Estimated completion time (hours): 1.7

SIX-3021 IMPLEMENT AND VALIDATE

Course Description

Improvements to a process are almost always needed to meet the goals of an organization. Many Six Sigma tools can be used to implement and validate the improvements.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the steps to improve a process
- Identify Six Sigma tools used to improve a project
- Identify Six Sigma tools used to validate improvement efforts

Estimated completion time (hours): 0.8

SIX-3022 CONTROL PLANS

Course Description

The control plan is one of the most important documents used to maintain the gains made during the analysis and improve portions of a Six Sigma project. The control plan is a “living” document that is continually updated to capture continuing improvements.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the minimum requirements for a control plan
- List sources of information for a control plan
- List required documents based on a control plan
- Define a dynamic control plan

Estimated completion time (hours): 1.0

AUTOMATION COURSES

INTRODUCTION TO INDUSTRIAL AUTOMATION

AUT-1001 INTRODUCTION TO AUTOMATION

Course Description

Automation is the use of devices, machines, and control systems to decrease the need for human work. Automated systems are used in numerous industries due to their economic benefits. Understanding of automation, its benefits, and the power sources used in automated systems is important to the success of an automation technician.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the role and importance of automated processes
- List the power sources of some automated processes
- Identify different types of components used in pneumatic/electro-pneumatic installations or circuits

Estimated completion time (hours): 0.8

AUT-1002 AUTOMATED PROCESS

Course Description

Automated systems are capable of performing a wide variety of tasks and processes. Even though the specific design of each automated system may vary, most share the same basic types of components.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify different assembly process steps
- Identify two types of process checks
- Define SCADA

Estimated completion time (hours): 1.1

AUT-1003 AUTOMATED SYSTEM

Course Description

At a basic level, all automated systems work in the same way regardless of their size or task. Understanding of the basic operations and communication performed in an automated system is the first step to understanding how to maintain them.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the components and stations of the SMC MAP 205 system
- Identify the assembly steps performed at each station
- Identify common manipulator types used in a pneumatic system

Estimated completion time (hours): 1.7

PROCESS CONTROLS

AUT-2001 INTRODUCTION TO PROCESS CONTROLS

Course Description

Process control systems are present in almost all modern automated and engineering systems. These systems are key to increasing productivity, maintaining quality, and improving safety.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a process
- Define a control
- List categories of processes
- Define an open-loop control system
- Define a closed-loop control system
- Identify the advantages of using process control

Estimated completion time (hours): 1.1

AUT-2002 PROCESS CONTROL SYSTEMS

Course Description

Process control systems are used in processes as simple as filling a tank with liquid and as complex as chemical engineering. However, the fundamentals and terminology are consistent for all control systems.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the basic components of manual and automatic control systems
- Identify the signal types in an automatic control system
- List the advantages of a manual control system
- List the advantages of an automatic control system
- List factors that cause errors in a process control system

Estimated completion time (hours): 1.7

AUT-2003 SET POINT/COMPARATOR

Course Description

Two key components of an automated process control system are the set point and the comparator. The set point device establishes a value for the desired state. The comparator device calculates how far the process is from this value.

Learning Objectives

By the end of this course, you will be able to do the following:

- List examples of set point devices
- Define an op-amp device
- List the functions that a comparator performs on feedback and input signals
- Understand how an error signal is produced in a differential amplifier
- Define gain

Estimated completion time (hours): 1.0

AUT-2004 CONTROLLER (PID CONTROL)

Course Description

Keeping modern industrial automated systems under control can require high-level calculations and decisions. The controller is the component in a feedback loop that makes the calculations and decisions.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the purpose of the controller in an automatic control system
- Understand the differences between proportional, integral, and derivative controls
- Identify the major types of PID controllers
- Define loop tuning
- Identify the major methods of loop tuning

Estimated completion time (hours): 1.5

AUT-2005 MULTIVARIATE PROCESSES

Course Description

Industrial processes often require the control of several variables to achieve the desired state of a finished product. This course will discuss controlling these multivariate processes.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a multivariate process
- Identify the key features of a multivariate process
- Identify applications of multivariate process controls
- Understand the terms coupling and decoupling

Estimated completion time (hours): 1.2

CNC MACHINING COURSES

INTRODUCTION TO MACHINING CNC-1001 INTRODUCTION TO MACHINING

Course Description
Machining is a process of utilizing a machine to shape, assemble, or remove excess material to produce a final product. In manufacturing, machining is primarily used to remove metal. Almost every product produced by manufacturing involves the use of metals. Metals are used in the end product, manufacturing of the end product, or both.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify different classifications of tools
 - List methods of removing metal
 - List methods of shaping metal
 - List common machining operations

Estimated completion time (hours): 1.5

CNC-1002 MACHINE TOOLS

Course Description
The machines used to shape or remove metal are called machine tools. Thousands of machine tools are available to perform either a specific type of machining operation or multiple machining operations. Companies often use a variety of machine tools to produce a single final product.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify different classifications of machine tools
 - List different methods of controlling a machine tool
 - List the advantages of manual, automatic, and CNC controlled machine tools
 - Identify the major areas of a CNC control

Estimated completion time (hours): 0.8

CNC-1003 CNC CONTROLLERS

Course Description
CNC machine tools are an integral part of manufacturing today. Almost every manufactured product either uses a CNC machine in its production or a tool that was manufactured on a CNC machine.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Understand the history of CNC machine tools
 - Identify the major areas of a CNC controller
 - Identify common features on a CNC controller

Estimated completion time (hours): 1.0

CNC-1004 MACHINING PERSONNEL

Course Description
Companies often use a variety of machine tools to produce a single final product. Companies also require personnel with varying levels and areas of expertise to utilize these machine tools efficiently to produce the product.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify different classifications of machining personnel
 - Identify the duties and requirements of various personnel classifications
 - Recognize the available career paths for production CNC operators

Estimated completion time (hours): 0.9

CNC-1005 FACILITY LAYOUT

Course Description
A manufacturing company places departments, machines, and other equipment in various arrangements to minimize the time and cost of manufacturing its products.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define facility layout
 - Identify different classifications of manufacturing facility layouts
 - List the advantages of each facility layout
 - Recognize the factors that determine which facility layout is chosen

Estimated completion time (hours): 1.5

CNC HORIZONTAL LATHE CNC-2001 COMPONENTS OF A CNC LATHE

Course Description
A computer numerical control (CNC) lathe is made up of many different components that work together and enable you to create machined, cylindrical parts. Learning about the components of a CNC lathe will give you a foundation of knowledge to build on as you advance in your training to become a CNC operator.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define a CNC lathe
 - List the components of a CNC lathe
 - Describe the purpose of each component
 - Describe how the axis assemblies move the tool turret

Estimated completion time (hours): 1.2

CNC-2002 MOVEMENTS OF A CNC LATHE

Course Description
A CNC lathe moves on two axes of travel. It uses a machine coordinate system and a part coordinate system to identify positions on the axes. Learning about how a CNC lathe moves and identifies positions will help you understand how the geometry of a part is defined and how the part is machined.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define movements on the Z-axis
 - Define movements on the X-axis
 - Describe the machine coordinate system
 - Define machine home
 - Describe the part coordinate system
 - Define part zero
 - Describe how ordered pairs are used to define the geometry of a part

Estimated completion time (hours): 0.9

CNC-2003 WORKHOLDING DEVICES AND TOOLING FOR A CNC LATHE

Course Description

Different types of workholding devices and different options for mounting tools make a computer numerically controlled (CNC) lathe versatile. Learning about these options will give you a better understanding of how a CNC lathe works.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify common workholding devices
- List the components of a chuck system
- List the components of a collet system
- Define two options for mounting tools on the tool turret

Estimated completion time (hours): 1.0

CNC-2004 THE CNC CONTROLLER FOR A CNC LATHE

Course Description

The CNC controller is a computer numerical control (CNC) device that directs the motions of the machine tool. Understanding the parts of the CNC controller and how they operate will enable you to operate a CNC lathe accurately and efficiently.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the five main areas of the CNC controller
- Describe how the operator controls work
- List the areas of the display screen
- List the areas of the keyboard
- Describe how the Shift key works
- Describe the side panel controls

Estimated completion time (hours): 1.1

CNC-2005 AUXILIARY SYSTEMS FOR A CNC LATHE

Course Description

The lubrication, coolant, and chip removal systems keep the CNC lathe components lubricated and free from dirt and debris. These systems are essential to the consistent production of quality products.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe how the lubrication system works
- Describe how the coolant system works
- Describe how the chip removal system works

Estimated completion time (hours): 0.8

CNC VERTICAL MACHINING CENTER

CNC-2006 COMPONENTS OF A CNC MACHINING CENTER

Course Description

A computer numerical control (CNC) machining center is made up of many different components that work together and enable you to create machined parts. Learning about the components of a CNC machining center will give you a foundation of knowledge to build on as you advance in your training to become a CNC operator.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a CNC machining center
- List the components of a CNC machining center
- Describe the purpose of each component
- Describe how the axis assemblies move the spindle head assembly and the table

Estimated completion time (hours): 1.2

CNC-2007 CNC MACHINING CENTER MOVEMENTS

Course Description

A CNC machining center moves on three axes of travel. It uses a machine coordinate system and a part coordinate system to identify positions on the axes. Learning about how a CNC machining center moves and identifies positions will help you understand how the geometry of a part is defined and how the part is machined.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define movements on the Z-axis
- Define movements on the Y-axis
- Define movements on the X-axis
- Describe the machine coordinate system
- Define machine home
- Describe the part coordinate system
- Define part zero
- Describe how ordered triplets are used to define the geometry of a part

Estimated completion time (hours): 0.9

CNC-2008 WORKPIECE AND TOOL HOLDING DEVICES FOR A CNC MACHINING CENTER

Course Description

Different types of workholding devices and tool holders make a computer numerically controlled (CNC) machining center versatile. Learning about workholding devices and tool holders will give you a better understanding of how a CNC machining center works.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify common workholding devices
- List the components of a vise
- List the components of a fixture
- List the components of a tool holder
- Describe how an automatic tool change occurs

Estimated completion time (hours): 0.9

CNC-2009 THE CNC CONTROLLER FOR A CNC MACHINING CENTER

Course Description

The CNC controller is a computer numerical control (CNC) device that directs the motions of the machine tool. Understanding the parts of the CNC controller and how they operate will enable you to operate a CNC machining center accurately and efficiently.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the five main areas of the CNC controller
- Describe how the operator controls work
- List the areas of the display screen
- List the areas of the keyboard
- Describe how the Shift key works
- Describe the side panel controls

Estimated completion time (hours): 1.1

CNC-2010 AUXILIARY SYSTEMS FOR A CNC MACHINING CENTER

Course Description

The lubrication, coolant, and chip removal systems keep the CNC machining center components lubricated and free from dirt and debris. These systems are essential to the consistent production of quality products.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe how the lubrication system works
- Describe how the coolant system works
- Describe how the chip removal system works

Estimated completion time (hours): 0.8

CNC MACHINE LUBRICANTS

CNC-2011 CNC MACHINE LUBRICANTS

Course Description

Lubricants are critical to the operation and performance of CNC machines. It is important to understand the uses and purposes of the main types of lubricants.

Learning Objectives

By the end of this course, you will be able to do the following:

- Distinguish between lubricating oils and greases
- Identify advantages of grease over lubricating oil
- Identify ingredients in lubricating oil and grease
- Define viscosity

Estimated completion time (hours): 1.1

CNC HORIZONTAL LATHE APPLICATIONS

CNC-4001 MAINTENANCE TASKS FOR A CNC LATHE

Course Description

As a CNC operator, you will be responsible for tasks related to maintaining the machine tool. Properly maintaining the machine tool helps to ensure it stays in good working order.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe how to check the coolant level
- Describe how to fill the coolant tank
- Describe how to check the air pressure
- Describe how to check the level of lubricating oil
- Describe how to check the level of grease
- Describe how to check the level of hydraulic oil

Estimated completion time (hours): 0.8

CNC-4002 POWER ON THE CNC LATHE

Course Description

In this lesson, you will learn about the power-on process. The power-on process turns on the electrical power to the CNC lathe.

Estimated completion time (hours): 0.9

CNC-4003 MOVE THE AXES BY ROTATING THE JOG HANDLE ON A CNC LATHE

Course Description

In this lesson, you will learn about moving the axes manually by rotating the Jog Handle. This is sometimes called jogging, or hand jogging, the axes.

Estimated completion time (hours): 0.8

CNC-4004 HOME THE AXES ON A CNC LATHE

Course Description

In this lesson, you will learn about homing the axes. Homing the axes sends the axes to the machine-home position. Homing the axes is also called zero returning the axes.

Estimated completion time (hours): 0.7

CNC-4005 SELECT A PART PROGRAM FROM MEMORY ON A CNC LATHE

Course Description

In this lesson, you will learn about selecting a part program from memory. Multiple part programs can be stored in the CNC controller, but only one part program can be active at a time. Selecting a part program loads it into the memory of the CNC controller and makes it active so that it can be used to machine parts.

Estimated completion time (hours): 0.7

CNC-4006 START THE PART PROGRAM SAFELY ON A CNC LATHE

Course Description

In this lesson, you will learn how to start the part program in a safe manner.

Estimated completion time (hours): 0.8

CNC-4007 INTERRUPT AUTOMATIC OPERATION ON A CNC LATHE

Course Description

In this lesson, you will learn how to interrupt automatic operation. Interrupting automatic operation is the process of stopping the motion of the axes, the rotation of the spindle, and the flow of the coolant.

Estimated completion time (hours): 0.7

CNC-4008 ADJUST A TOOL WEAR OFFSET ON A CNC LATHE

Course Description

In this lesson, you will learn to adjust the tool wear offset in the CNC controller. Adjusting the tool wear offset is necessary because, as cutting tools wear, the dimensions they are machining may increase or decrease. The tool wear offset process allows you to change the position of the cutting tool to compensate for the tool wear.

Estimated completion time (hours): 0.7

CNC-4009 POWER OFF THE CNC LATHE

Course Description

In this lesson, you will learn about the power-off process. The power-off process prepares the CNC lathe to be shut down and then turns the power off.

Estimated completion time (hours): 0.7

CNC LATHE PROGRAMS

CNC-4010 CNC PROGRAMMING PROCEDURE FOR A CNC LATHE

Course Description

CNC lathes require a program to maximize the machine’s capabilities. Creating a CNC program is only performed after a careful planning stage to determine exactly what machining operations and which part dimensions the CNC lathe will need to machine.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a CNC program
- Define the steps in CNC programming
- Understand the importance of thoroughly planning the creation of a CNC program
- Define program zero
- Distinguish between machine zero and program zero
- List common points used as a program zero
- List methods of creating a CNC program

Estimated completion time (hours): 1.2

CNC-4011 CNC PROGRAM STRUCTURE FOR A CNC LATHE

Course Description

A CNC lathe program is required to be organized in a specific manner for the controller to understand the instructions within the program. Each instruction must also be organized.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a stop code
- Define an end of block symbol
- Understand the use of parentheses in a CNC program
- List the two sections of a CNC lathe program
- Distinguish between a block and a word
- Understand the purpose of the program end function

Estimated completion time (hours): 1.0

CNC-4012 CNC ADDRESSES FOR A CNC LATHE

Course Description

The address of a word in a CNC program defines the meaning of the word. Understanding the meaning of common words in a CNC program is important to recognize what actions the CNC machine tool will perform.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the purpose of G codes
- Define the purpose of S,T, and M words
- Understand the importance of G code groups
- Define the meaning of common G codes
- Define the meaning of common M words
- Understand the numeric value of a T word
- Understand the importance of the format of the numeric data in a word

Estimated completion time (hours): 2.1

CNC-4013 CNC LATHE COMMANDS

Course Description

The instructions written in G code programming that produce an action by a CNC lathe are called commands. A command may require a single word, a block, or multiple blocks.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the requirements to command a spindle function
- Understand the requirements to command a linear movement
- Understand the requirements to command a circular movement

Estimated completion time (hours): 1.0

CNC-4014 ORGANIZING A CNC PROGRAM FOR A CNC LATHE

Course Description

Building a CNC lathe program that is versatile requires organizing sections into an order that will safely produce a part that meets all of the required specifications.

Learning Objectives

By the end of this course, you will be able to do the following:

- List common commands used in each section of the body of a CNC program
- Define a safe start block

Estimated completion time (hours): 0.8

CNC VERTICAL MACHINING CENTER APPLICATIONS

CNC-4015 MAINTENANCE TASKS FOR A CNC MACHINING CENTER

Course Description

As a CNC operator, you will be responsible for tasks related to maintaining the machine tool. Properly maintaining the machine tool helps to ensure it stays in good working order.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe how to check the coolant level
- Describe how to fill the coolant tank
- Describe how to check the air pressure
- Describe how to check the level of lubricating oil
- Describe how to check the level of grease

Estimated completion time (hours): 0.7

CNC-4016 POWER ON THE CNC MACHINING CENTER

Course Description

In this lesson, you will learn about the power-on process. The power-on process turns on the electrical power to the CNC machining center.

Estimated completion time (hours): 0.9

CNC-4017 MOVE THE AXES BY ROTATING THE JOG HANDLE ON A CNC MACHINING CENTER

Course Description

In this lesson, you will learn about moving the axes manually by rotating the Jog Handle. This is sometimes called jogging, or hand jogging, the axes.

Estimated completion time (hours): 0.8

CNC-4018 HOME THE AXES ON A CNC MACHINING CENTER

Course Description

In this lesson, you will learn about homing the axes. Homing the axes sends the axes to the machine-home position. Homing the axes is also called zero returning the axes.

Estimated completion time (hours): 0.7

CNC-4019 SELECT A PART PROGRAM FROM MEMORY ON A CNC MACHINING CENTER

Course Description

In this lesson, you will learn about selecting a part program from memory. Multiple part programs can be stored in the CNC controller, but only one part program can be active at a time. Selecting a part program loads it into the memory of the CNC controller and makes it active so that it can be used to machine parts.

Estimated completion time (hours): 0.7

CNC-4020 START THE PART PROGRAM SAFELY ON A CNC MACHINING CENTER

Course Description

In this lesson, you will learn how to start the part program in a safe manner.

Estimated completion time (hours): 0.8

CNC-4021 INTERRUPT AUTOMATIC OPERATION ON A CNC MACHINING CENTER

Course Description

In this lesson, you will learn how to interrupt automatic operation of the machining center. Interrupting automatic operation is the process of stopping the motion of the axes, the rotation of the spindle, and the flow of the coolant.

Estimated completion time (hours): 0.7

CNC-4022 ADJUST A TOOL WEAR OFFSET ON A CNC MACHINING CENTER

Course Description

In this lesson, you will learn to adjust the tool wear offset in the CNC controller. Adjusting the tool wear offset is necessary because, as cutting tools wear, the dimensions they are machining may increase or decrease. The tool wear offset process allows you to change the position of the cutting tool to compensate for the tool wear.

Estimated completion time (hours): 0.7

CNC-4023 POWER OFF THE CNC MACHINING CENTER

Course Description

In this lesson, you will learn about the power-off process. The power-off process prepares the CNC machining center to be shut down and then turns the power off.

Estimated completion time (hours): 0.7

CNC MACHINING CENTER PROGRAMS

CNC-4024 CNC PROGRAMMING PROCEDURE FOR A CNC MACHINING CENTER

Course Description

A CNC machining center requires a program to maximize the machine’s capabilities. Creating a CNC program is only performed after a careful planning stage to determine exactly what machining operations and which part dimensions the CNC machining center will need to machine.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a CNC program
- Define the steps in CNC programming
- Understand the importance of thoroughly planning the creation of a CNC program
- Define program zero
- Distinguish between machine zero and program zero
- Explain the relationship between work offsets, machine zero, and program zero
- List methods of creating a CNC program

Estimated completion time (hours): 1.2

CNC-4025 CNC PROGRAM STRUCTURE FOR A CNC MACHINING CENTER

Course Description

A CNC machining center program is required to be organized in a specific manner for the controller to understand the instructions within the program. Each instruction must also be organized.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a stop code
- Define an end of block symbol
- Understand the use of parentheses in a CNC program
- List the two sections of a CNC machining center program
- Distinguish between a block and a word
- Understand the purpose of the program end function

Estimated completion time (hours): 1.0

CNC-4026 CNC ADDRESSES FOR A CNC MACHINING CENTER

Course Description

The address of a word in a CNC machining center program defines the meaning of the word. Understanding the meaning of common words in a CNC program is important to recognize what actions the CNC machine tool will perform.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the purpose of G codes
- Define the purpose of S,T, and M words
- Understand the importance of G code groups
- Define the meaning of common G codes
- Define the meaning of common M words
- Understand the numeric value of aT word
- Understand the importance of the format of the numeric data in a word

Estimated completion time (hours): 2.2

CNC-4027 CNC MACHINING CENTER COMMANDS

Course Description

The instructions written in G code programming that produce an action by a vertical CNC machining center are called commands. A command may require a single word, a block, or multiple blocks.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the requirements to command a tool change function
- Understand the requirements to command a spindle function
- Understand the requirements to command a linear movement
- Understand the requirements to command a circular movement
- Understand the requirements for canned cycle commands

Estimated completion time (hours): 1.7

CNC-4028 ORGANIZING A CNC PROGRAM FOR A CNC MACHINING CENTER

Course Description

Building a CNC machining center program that is versatile requires organizing sections into an order that will safely produce a part that meets all of the part’s requirements.

Learning Objectives

By the end of this course, you will be able to do the following:

- List common commands used in each section of the body of a CNC program
- Define a safe start block

Estimated completion time (hours): 0.8

COMPOSITES COURSES

INTRODUCTION TO COMPOSITES

CMP-1001 BACKGROUND AND HISTORY OF COMPOSITES

Course Description

Composites are everywhere in our lives. Understanding the background and history of composites is important information in understanding their use.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a composite material
- List the two constituents of composite materials
- List types of composite materials
- List the major purpose of a binder
- List the major purpose of a reinforcement

Estimated completion time (hours): 0.7

CMP-1002 COMPOSITE INDUSTRIES AND PRODUCTS

Course Description

Composite materials are used in many industries to manufacture a wide variety of products. Understanding the uses of composite materials helps to understand the benefit of using them.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify industries that use composite materials
- Identify products that are made of composite material
- List the three main types of fibers used in composite material

Estimated completion time (hours): 0.8

CMP-1003 ADVANTAGES AND DISADVANTAGES OF COMPOSITES

Course Description

Engineers can choose from a variety of materials when designing a new product. Understanding the advantages and disadvantages of composite materials is important information in understanding why they are chosen for a product.

Learning Objectives

By the end of this course, you will be able to do the following:

- List advantages of fiber reinforced plastic composite materials
- List disadvantages of fiber reinforced plastic composite materials
- List factors determining the type of material used in a product

Estimated completion time (hours): 1.1

CMP-1004 SAFETY AND HAZARDS OF COMPOSITES

Course Description

The materials used to produce composite products have certain hazards associated with them than can affect the safety of personnel. Understanding these hazards is important information for anyone working with composite materials.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify hazards associated with fiber material
- Identify hazards associated with matrix materials
- Be familiar with methods of how to minimize the hazards of handling composite materials, resins and associated items

Estimated completion time (hours): 0.8

COMPOSITES MANUFACTURING FACILITIES
CMP-1005 FACILITY LAYOUT

Course Description
The efficient manufacturing of any product is highly dependent on the arrangement of the departments, equipment, and personnel within a building. This arrangement is referred to as the facility layout.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define facility layout
 - Identify different classifications of manufacturing facility layouts
 - List the advantages of each facility layout
 - Recognize the factors that determine which facility layout is chosen

Estimated completion time (hours): 1.1

CMP-1006 NON-CONTROLLED CONTAMINATION AREAS

Course Description
In a composite manufacturing facility, controlled contamination areas are separated from areas that produce contamination or are exposed to contamination.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List areas separated from controlled contamination areas
 - List methods of separating controlled contamination areas from non-controlled areas

Estimated completion time (hours): 0.7

CMP-1007 LAY-UP AREA

Course Description
The layup area is a critical section of a composite manufacturing facility. Proper layout and organization of the layup area is critical to efficiently producing quality composite parts.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List items typically found in the layup area
 - List different workstation configurations used in the layup area

Estimated completion time (hours): 0.8

CMP-1008 CURING AREA

Course Description
The curing area is a section of a composite manufacturing facility where materials become true composite parts. Proper layout and organization of the curing area is critical to efficiently producing cured composite parts.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List items typically found in the curing area
 - List common activities of technicians in the curing area

Estimated completion time (hours): 0.7

MATERIALS USED IN COMPOSITES MANUFACTURING
CMP-2001 FIBER BASED COMPOSITES

Course Description
Fiber based composites are often referred to as advanced composites. Understanding the forms in which fiber is made is important information for anyone working with fiber reinforced composites.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify common fiber materials used in advanced composites
 - Define tow
 - Define yarn
 - Define filament
 - Identify common forms made of fibers

Estimated completion time (hours): 0.9

CMP-2002 FIBERS, TAPES AND FABRICS

Course Description
There are many different applications for fibers, tapes, and fabrics in the manufacture of composite parts. Understanding the properties of each form of composite material is important information for anyone working with composite materials.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Understand how plies of tape can strengthen a composite part in multiple directions
 - Identify common fabric weaves
 - Define fabric drapability and symmetry
 - Identify how the fabric weaves effect fabric properties

Estimated completion time (hours): 1.1

CMP-2003 GLASS AND CARBON FIBERS

Course Description
The two most common materials used in fiber reinforced plastics are glass and carbon. Understanding the properties of these two fiber materials is important information for anyone working with fiber reinforced composites.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define terms including tensile strength, stress, elastic range, plastic range, strain, tensile modulus, shear or rigidity modulus, and brittleness
 - Describe the properties of e-glass and s-glass
 - Identify the steps in the manufacturing process of glass fibers
 - Describe the properties of carbon fibers
 - Identify the steps in the manufacturing process of carbon fibers

Estimated completion time (hours): 1.2

CMP-2004 MATRIX TYPES AND PROPERTIES

Course Description

The matrix is an important constituent of fiber reinforced plastics. Understanding the types and properties of matrices is important information for anyone working with fiber reinforced plastics.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a polymer, monomer, and mer
- Define resin
- Define hydrocarbon
- List different polymers used as matrices
- Differentiate between thermoset and thermoplastic materials
- Define the advantages of prepreg and two-part resin systems

Estimated completion time (hours): 1.3

CMP-2005 CURING PROCESS

Course Description

The curing process is a critical step in the production of a composite part. Understanding the curing process is important information for anyone working with composites.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the importance of the curing process in the production of composite parts
- Define ramp rate and soak/cure time
- Understand the importance of ramp rates and soak/cure times
- Understand the difference between atmospheric, gauge, and vacuum pressure
- Distinguish between co-curing and co-bonding

Estimated completion time (hours): 1.1

CMP-2006 HONEYCOMB CORE MATERIALS

Course Description

Honeycomb core materials are used in sandwich structures. A sandwich structure is a structure that has two composite skin bonded to a core material.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the three stresses that interact with a honeycomb core structure
- Explain how these stresses are reduced through the use of honeycomb core materials
- List the most common types of honeycomb core materials
- Describe and differentiate between the honeycomb core materials
- List the three honeycomb core cell shapes
- Explain how honeycomb core materials are used in commercial applications
- Describe the four types of edge sealing
- List the tools that are used to cut and finish honeycomb core materials
- Describe the purpose of adhesive film in a honeycomb structure

Estimated completion time (hours): 0.9

CMP-2007 MATERIAL COMPATIBILITY

Course Description

A sandwich structure is a structure that has two composite skin panels adhesively bonded to a core material. When different materials are used together, they must be compatible.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define sandwich structures
- Explain the compatibility between carbon fiber and expanded paper, aramid, aluminum, and foam core

Estimated completion time (hours): 0.7

CMP-2008 GALVANIC REACTIVITY

Course Description

Galvanic corrosion occurs when two materials from different positions on the galvanic scale come into contact with each other in the presence of a conductive liquid. Galvanic corrosion causes one of the materials to corrode or to be gradually eaten away.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define galvanic corrosion
- Explain the galvanic scale
- Define noble metals
- List methods for preventing galvanic corrosion

Estimated completion time (hours): 0.7

CMP-2009 CORE POTTING COMPOUNDS

Course Description

Core potting compound is a lightweight paste resin used to fill the edges or other areas of a honeycomb core in a sandwich structure.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define potting
- Define core potting compound
- Describe why core potting compound is used
- Explain material compatibility of core potting compound

Estimated completion time (hours): 0.7

COMPOSITE MATERIAL STORAGE

CMP-2010 FIBER MATERIAL STORAGE

Course Description

Proper care and storage of fiber based materials is important in producing defect-free composite parts. Understanding the care and storage requirements is important information for anyone working with composite parts.

Learning Objectives

By the end of this course, you will be able to do the following:

- List general requirements of storing fiber based materials
- Define shelf life
- Understand the effect of temperature on shelf life
- Define exposure time
- Understand how exposure time is tracked
- Define kitting
- List steps for preparing prepreg material for use

Estimated completion time (hours): 0.9

CMP-2011 CONTROLLED CONTAMINATION AREAS

Course Description

One of the best methods of controlling contamination in composite parts is to create controlled contamination areas within the manufacturing plant. Understanding the requirements of controlled contamination areas is important information for anyone working with composite parts.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define controlled contamination area
- Define the methods of controlling contamination in a controlled contamination area
- List common clothing requirements to contain contamination in a composite layup room
- Define the effects contamination has in cured composite parts

Estimated completion time (hours): 0.9

TOOLS USED IN COMPOSITE MANUFACTURING
CMP-2012 LOCAL EXHAUST VENTILATION

Course Description

Proper ventilation is critical for the safety of employees in manufacturing. A local exhaust ventilation system is required when a manufacturing process produces dust, smoke, fumes, or vapors that must be contained.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the uses of a ventilation booth
- List the parts of a ventilation booth
- List the uses of a downdraft table
- List the parts of a downdraft table
- Describe which manufacturing processes require local exhaust ventilation

Estimated completion time (hours): 1.1

CMP-2013 FORMING TOOLS

Course Description

The manufacturing of composite products requires many tools. In this course, you'll learn about forming tools. You'll explore the type of materials used in forming tools and also learn about the factors to consider when choosing a material.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the various materials used in forming tools
- Understand the compatibility of tool materials with composite part materials

Estimated completion time (hours): 1.0

CMP-2014 COEFFICIENT OF THERMAL EXPANSION

Course Description

You can calculate how much a tool or composite part increases in size when heated. In this course, you'll learn about coefficient of thermal expansion (CTE) and how to calculate the CTE of various materials.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define coefficient of thermal expansion (CTE)
- Calculate the CTE of common materials

Estimated completion time (hours): 0.7

CMP-2015 FORMING TOOL INSPECTION

Course Description

Preparing a tool to produce a composite part is a critical step in the manufacture of the composite part. One of the key preparations includes inspecting the tools for common defects. In this course, you'll learn about common defects, as well as common methods of tool inspection.

Learning Objectives

By the end of this course, you will be able to do the following:

- List common defects of tools
- List common methods of inspecting tools

Estimated completion time (hours): 0.8

CMP-2016 FORMING TOOL CLEANING

Course Description

Preparing a tool to produce a composite part is a critical step in the manufacture of the composite part. One of the key preparations includes cleaning the tools and applying a release agent before each layup is performed. In this course, you'll learn about the steps involved in this process.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the requirements of tool strip cleaning, tool preparation (prep) cleaning, and release agent application
- Identify when a tool prep clean is performed and when a tool strip clean is performed
- Understand how to perform a tool prep clean and a tool strip clean
- Understand how to properly apply a release agent

Estimated completion time (hours): 0.9

CMP-2017 FORMING TOOL STORAGE

Course Description

Preparing a tool to produce a composite part is a critical step in the manufacture of the composite part. Properly storing the tool is important to anyone working with tools and composite parts. In this course, you'll learn about the steps involved in preparing a tool for storage.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the proper methods of transporting and storing tools
- List reasons for protecting tools in storage

Estimated completion time (hours): 0.7

CMP-2018 ROLLERS AND SWEEPS

Course Description

Many tools are used in the manufacturing of composite parts. In this course, you'll learn about hand tools.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the use and care of hand tools in layup
- List guidelines for proper storage

Estimated completion time (hours): 0.6

CMP-2019 OVERHEAD LASER SYSTEM

Course Description

An overhead laser system is a valuable tool to perform a layup of a composite part. Understanding the components and operation of an overhead laser system is important for technicians performing layups.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the purpose of an overhead laser system
- List the components of an overhead laser system
- Understand the operation of an overhead laser system
- Understand the importance of reflective targets

Estimated completion time (hours): 1.0

COMPOSITE MATERIAL KITTING

CMP-3001 KITTING WITH A SHEETER

Course Description

Kitting is the process of cutting and collating uncured fiber material for a composite component before the actual layup process. A sheeter is an automated cutting system used to cut sheets of fiber material. The desired length of material is input into a computer and the sheeter cuts the material to that length.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define kitting
- Define a controlled contamination area
- List the personal protective equipment used when kitting with a sheeter
- List the components of a sheeter
- Describe the process of kitting with a sheeter

Estimated completion time (hours): 0.9

CMP-3002 KITTING BY HAND

Course Description

Kitting is the process of cutting and collating uncured fiber material for a composite component before the actual layup process.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define kitting
- Define a controlled contamination area
- List the personal protective equipment used when kitting by hand
- Evaluate ply orientation using a rosette
- Describe the process of kitting by hand
- List operator responsibilities for kitting by hand

Estimated completion time (hours): 0.8

CMP-3003 KITTING WITH AUTOMATED MACHINES

Course Description

Kitting is the process of cutting and collating uncured fiber material for a composite component before the actual layup process. An automated cutting machine is a cutting system used to cut shapes out of fiber material. A knife moves across the fiber material cutting the shapes. The movements of the knife are controlled by the computer.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define kitting
- Define a controlled contamination area
- List the personal protective equipment used when kitting with automated machines
- List the components of an automated cutting machine
- Describe the process of kitting with an automated cutting machine

Estimated completion time (hours): 0.9

COMPOSITE PART LAYUP AND BAGGING

CMP-3004 PLY BALANCING

Course Description

A composite part increases its strength by adding plies with fibers at different orientations. Engineers use computers and software to design composite parts and determine the number and orientations of each ply so that the finished composite part will be strong enough to withstand expected and unexpected loads in the final product.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the differences between a balanced and unbalanced layup
- Understand the effects both balanced and unbalanced layups have on the finished composite part’s strength

Estimated completion time (hours): 0.9

CMP-3005 MATERIAL SPLICING

Course Description

In very large or complex composite parts, it is often necessary to make a complete ply layer out of two or more pieces of material. When two or more pieces are used to form a ply layer, the pieces must be positioned so that they will bond together during curing to form a continuous layer in the finished part. The area where these pieces are joined together is called a splice.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define and identify the use of a butt splice
- Define and identify the use of an overlap splice
- List common requirements of a butt splice
- List common requirements of an overlap splice
- List common requirements for staggering splices

Estimated completion time (hours): 0.8

CMP-3006 WRINKLES AND GAPS

Course Description

In composite manufacturing, a wrinkle is an area of a ply that does not lay flat and smooth. The plies overlap, buckle, or fold back on themselves. A gap is an unintended separation between the fibers in a ply.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define wrinkle
- Define gap
- Describe the consequences of wrinkles and gaps
- List ways to prevent wrinkles and gaps
- Describe how to use the splice table on an engineering drawing

Estimated completion time (hours): 0.7

CMP-3007 POCKETS AND VOIDS

Course Description

In composite manufacturing, a void is an area of unintended separation between the layers of the finished composite part. Voids are also called pockets.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define void
- Define porosity
- List the causes of voids and porosity
- Describe the consequences of a void or porosity
- List ways that voids and porosity can be prevented

Estimated completion time (hours): 0.7

CMP-3008 RADIUS FILLER FABRICATION BY HAND

Course Description

Radius filler is fiber material used to fill a void in the laid-up composite part. The process for creating radius filler has four steps.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define radius filler
- Describe the process for creating radius filler

Estimated completion time (hours): 0.7

CMP-3009 ADVANCED BAGGING

Course Description

A poorly bagged part can impact the success of the curing cycle. A bag that leaks will not maintain a vacuum and the part will not be compacted as needed. A bag that is not pleated properly might rupture during the curing cycle.

Improper bagging techniques can lead to defects in the part, with the end result that the part is not acceptable and must be scrapped.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the techniques for bagging and curing three dimensional assemblies

Estimated completion time (hours): 0.7

CMP-3010 BAGGING AND LAY-UP EQUIPMENT

Course Description

Lay-up and bagging is a process for creating composite components. To perform lay-up and bagging tasks, you need to know how to use specialized equipment and materials.

By the end this course, you will be able to do the following:

- Identify the equipment and materials used in bagging and laying up composite components
- Identify the purpose of each piece of equipment
- Understand the role of the equipment in the bagging and lay-up process

Estimated completion time (hours): 1.4

CMP-3011 PREPARATION FOR THE LAY-UP PROCESS

Course Description

Lay-up is the process for layering the composite materials when constructing a composite component.

Understanding the purpose of each lay-up type is essential to your success in composite manufacturing. The type of lay-up will determine the structural properties of the composite component.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the documentation used in laying up composite components
- Identify material orientation used in laying up composite components
- Understand the purpose of material orientation used in composite lay-up
- Identify different lay-up types

Estimated completion time (hours): 1.1

CMP-3012 CURE CYCLE CONTROLLERS - TEMPERATURE CONTROLS

Course Description

A cure cycle controller is a computer system that controls the heating elements, heating blankets, and other accessories used for curing composite structures.

Learning Objectives

By the end of this course, you will be able to do the following:

Define cure cycle controller

List the components of a hot bonder

Describe how a hot bonder is programmed

Describe the proper care and storage of a hot bonder

Estimated completion time (hours): 1.0

CMP-3013 THERMOCOUPLE SCIENCE

Course Description

A thermocouple is a sensor used to measure the temperature of the composite part during the curing cycle.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe thermo-management in composite manufacturing
- Understand the proper placement and number of thermocouples required for proper thermo-management of the part during the cure process
- Explain the basic science of exothermic reactions and their relation to part geometry and thickness

Estimated completion time (hours): 0.7

INSPECTING COMPOSITES PARTS
CMP-3014 INTRODUCTION TO INSPECTION OF COMPOSITES

Course Description

The inspection of a composite part is critical to ensuring the part meets its design requirements. This course introduces the different inspection techniques and the terms used in inspection of composite parts.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the difference between destructive and nondestructive testing
- Understand the difference between discontinuities, indications, flaws, and defects
- List common flaws and defects of composite parts
- List common nondestructive tests used with composite parts
- Distinguish between qualified and certified NDE technicians
- Understand the responsibilities of the different levels of NDE technicians

Estimated completion time (hours): 1.5

CMP-3015 VISUAL INSPECTION FOR COMPOSITES

Course Description

Visual inspection of a composite part is typically the first and most basic method of inspection because if a product looks bad, it probably is bad, and no further inspection may be needed.

Learning Objectives

By the end of this course, you will be able to do the following:

- List equipment used in visual inspections
- List requirements of a visual inspection
- List common defects of composite parts that can and cannot be detected in a visual inspection

Estimated completion time (hours): 1.0

CMP-3016 ULTRASONIC INSPECTION FOR COMPOSITES

Course Description

Ultrasonic inspection is a nondestructive inspection method that uses vibrations to detect internal defects in a composite part.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define ultrasonic inspection
- List common components of ultrasonic equipment
- List requirements of an ultrasonic inspection
- List common defects of composite parts that can and cannot be detected in an ultrasonic inspection
- List common formats displayed by ultrasonic equipment

Estimated completion time (hours): 0.9

CMP-3017 TAP INSPECTION FOR COMPOSITES

Course Description

Tap inspection is the simplest method of detecting subsurface defects in a composite part. Understanding the process of a tap inspection is important information for technicians manufacturing or repairing composite parts.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a tap inspection
- List requirements of a tap inspection
- Describe the process of performing a tap inspection
- Use the correct technique to tap composite parts
- Identify different devices used in tap inspections

Estimated completion time (hours): 1.2

COMPOSITE PART DAMAGE AND REPAIR
CMP-3018 COMPOSITE REPAIRS

Course Description

Repairing damage to a composite aircraft is a complex process that requires specialized equipment, education, and training. The process of repairing composites is controlled through strict regulations and manufacturer's documentation.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the need for regulations and documentation in composite repair
- Define the need for the Structural Repair Manual
- Explain the Structural Repair Manual numbering system
- List the potential hazards of working with composite repair materials
- Explain the composite repair process
- Understand why it is necessary to document the repair process
- Find and use the appropriate documentation during the repair process

Estimated completion time (hours): 1.0

CMP-3019 AIRCRAFT DAMAGE

Course Description

An aircraft can be damaged in a variety of ways. All damage is classified into defined categories based upon the type and severity of damage. Defining the type of damage is an essential step in the composite repair process.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define damage
- Identify all of the possible types of damage
- List all of the descriptions of the possible types of damage
- Define the difference between repairable and nonrepairable damage
- Define the difference between major and minor repairable damage
- List all of the descriptions of the possible types of damage
- Describe how and when to use the Structural Repair Manual during the damage assessment process

Estimated completion time (hours): 1.1

CMP-3020 DAMAGE ASSESSMENT

Course Description

Assessing the damage in composite structures requires specialized inspection equipment and highly trained personnel. Understanding the tools and techniques that are used to assess damage is important.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the damage assessment process
- List the major types of damage assessment equipment
- Explain the function of each of the different types of NDE equipment
- Describe the damage mapping process

Estimated completion time (hours): 2.8

CMP-3021 REPAIR TOOLS AND MATERIALS

Course Description

There are many different types of tools, equipment, and materials used to perform a successful composite repair. Each one has a unique purpose in the repair process.

Learning Objectives

By the end of this course, you will be able to do the following:

- List all of the tools you will need to perform a repair
- Explain the purpose of each one in the repair process
- List all of the bagging and lay-up materials you will need to perform the repair
- List all of the composite materials you will need to perform the repair

Estimated completion time (hours): 1.6

COMPOSITE LAYUP PROJECTS

CMP-4001 UNIDIRECTIONAL 4 PLY LAY-UP

Course Description

In this course, you will learn how to build a simple composite component using unidirectional, pre-impregnated composite materials.

Learning Objectives

By the end of this course you will be able to do the following:

- Build a simple composite component using unidirectional, pre-impregnated composite materials.

Estimated completion time (hours): 1.5

CMP-4002 CARBON 8 PLY LAY-UP WITH CORE

Course Description

In this course, you will learn how to build a complex composite component using pre-impregnated composite materials and core materials.

Learning Objectives

By the end of this course you will be able to do the following:

- Build a complex composite component using unidirectional, pre-impregnated composite materials and core materials

Estimated completion time (hours): 1.6

CMP-4003 FIBERGLASS 6 PLY WET LAY-UP

Course Description

In this course, you will learn how to build a simple composite component using fiberglass materials and liquid resins.

Learning Objectives

By the end of this course you will be able to do the following:

- Build a composite component using fiberglass cloth materials and liquid resins

Estimated completion time (hours): 1.7

DRILLING COMPOSITES PROJECT

CMP-4004 DRILLING COMPOSITE MATERIAL

Course Description

To drill a quality hole in composite material, you need to have good basic drilling knowledge and skills.

Learning Objectives

By the end of this course, you will be able to do the following:

- List some qualities of composite material
- Understand the hazards of working with composite materials
- Define a quality hole
- Understand how to drill a quality hole in composite material
- Recognize some common hole defects that occur in composite materials

Estimated completion time (hours): 1.6

CMP-4005 MARKING HOLE LOCATIONS

Course Description

Before holes are drilled into this composite assembly, their locations must be marked.

Learning Objectives

By the end of this course, you will be able to do the following:

- Recognize hole location information on an engineering drawing
- Explain where to find the tools and other supplies needed to create an assembly
- Properly measure and mark hole locations in this assembly

Estimated completion time (hours): 1.0

CMP-4006 DRILLING PILOT HOLES IN TITANIUM

Course Description

Pilot holes are typically the first holes drilled in an assembly. A quality hole starts with a properly located pilot hole created using correct drilling practices.

In this course, you will be shown how to drill pilot holes in a composite assembly.

Learning Objectives

By the end of this course, you will be able to do the following:

- Properly secure the assembly in the vise
- Install a pilot bit in a drill motor
- Drill pilot holes into an assembly

Estimated completion time (hours): 0.8

CMP-4007 DRILLING ROW JD3

Course Description

After the pilot holes are drilled in rows JD1, JD2, and JD4 through JD6, drill the pilot holes in row JD3 and then enlarge the holes to size.

Learning Objectives

By the end of this course, you will be able to do the following:

- Drill and enlarge the holes in row JD3 of the composite assembly

Estimated completion time (hours): 0.9

CMP-4008 DRILLING ROW JD7

Course Description

Once row JD3 is enlarged, drill and enlarge the holes in row JD7.

Learning Objectives

By the end of this course, you will be able to do the following:

- Drill and enlarge the holes in row JD7 of the composite assembly

Estimated completion time (hours): 0.9

CMP-4009 ENLARGING HOLES IN ROWS JD1 AND JD5

Course Description

Once row JD7 is enlarged, enlarge the remaining rows of holes, beginning with row JD1.

Learning Objectives

By the end of this course, you will be able to do the following:

- Enlarge the holes in rows JD1 and JD5 of the composite assembly

Estimated completion time (hours): 0.8

CMP-4010 ENLARGING HOLES IN ROWS JD2 AND JD6

Course Description

After drilling and enlarging rows JD1 and JD5, enlarge rows JD2 and JD6.

Learning Objectives

By the end of this course, you will be able to do the following:

- Enlarge the holes in rows JD2 and JD6 of the composite assembly

Estimated completion time (hours): 1.0

CMP-4011 ENLARGING HOLES IN ROW JD4

Course Description

After drilling and enlarging all the other rows of holes in the assembly, enlarge the holes in JD4.

Learning Objectives

By the end of this course, you will be able to do the following:

- Enlarge the holes in row JD4 of the composite assembly

Estimated completion time (hours): 0.8

COMPOSITE PART DAMAGE AND REPAIR PROJECT

CMP-4012 SURFACE DAMAGE ASSESSMENT

Course Description

When encountering an aircraft with suspected structural surface damage, a variety of damage assessment activities are necessary to determine the exact type and extent of the damage.

In this course, you will encounter an aircraft with suspected structural surface damage. You will perform a variety of damage assessment activities to determine the exact type and extent of this damage.

Learning Objectives

By the end of this course, you will be able to do the following:

- Perform the surface damage assessment process
- Find the required documentation for an aircraft
- Prepare an aircraft for surface damage assessment
- Perform a variety of surface damage assessment procedures
- Document your surface damage assessment results

Estimated completion time (hours): 1.1

CMP-4013 SURFACE DAMAGE REPAIR

Course Description

Repairing an aircraft with structural surface scratch damage to the original OEM standards involves several activities. In this course, you will repair an aircraft with structural surface scratch damage. You will perform a variety of activities to repair the aircraft to the original OEM standards.

Learning Objectives

By the end of this course, you will be able to do the following:

- Perform the surface damage repair process
- Find the required documentation for the surface damage repair process
- Prepare an aircraft for surface damage repair
- Remove the surface damaged materials
- Replace the surface damaged materials
- Document your surface damage repair activities

Estimated completion time (hours): 2.1

CMP-4014 DISBONDING DAMAGE ASSESSMENT

Course Description

Determining the exact type and extent of suspected structural surface damage with delamination requires several damage assessment activities.

In this course, you will encounter an aircraft with suspected structural surface damage. You will have to perform a variety of damage assessment activities to determine the exact type and extent of this damage.

Learning Objectives

By the end of this course, you will be able to do the following:

- Perform the disbonding damage assessment process
- Find the required documentation for an aircraft
- Prepare an aircraft for disbonding damage assessment
- Perform a variety of disbonding damage assessment procedures
- Document your disbonding damage assessment results

Estimated completion time (hours): 1.2

CMP-4015 DISBONDING DAMAGE REPAIR

Course Description

Repairing an aircraft with structural disbonding damage to the original OEM standards requires a variety of activities.

In this course, you will repair an aircraft with structural disbonding damage. You will perform a variety of activities to repair the aircraft to the original OEM standards.

Learning Objectives

By the end of this course, you will be able to do the following:

- Perform the disbonding damage repair process
- Find the required documentation for the disbonding damage repair process
- Prepare an aircraft for disbonding damage repair
- Remove the disbonding damaged materials
- Replace the disbonding damaged materials
- Document your disbonding damage repair activities

Estimated completion time (hours): 2.8

CUTTING TOOLS COURSES

CUT-2001 DRILL BITS

Course Description

Drill bits are used in conjunction with drill motors to drill holes in workpieces. In this course, you will learn about drill bits and how to choose the right bit for the hole you are drilling.

Learning Objectives

By the end of this course, you will be able to do the following:

- List different types of drill bits
- Describe the components of a drill bit
- Describe the purpose of a reamer
- List considerations for choosing the right drill bit

Estimated completion time (hours): 0.8

CUT-2002 DRILL GUIDES AND DRILL STOPS

Course Description

Two commonly used drilling attachments are drill guides and drill stops. Using these attachments will make it easier to drill a quality hole.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the parts of a drill guide
- Describe how a drill guide is used
- List the parts of a drill stop
- Describe how a drill stop is used
- Describe how a fixture is used
- Describe how a drill jig is used

Estimated completion time (hours): 0.9

CUT-2003 COUNTERSINKING TOOLS

Course Description

A countersink is a conical hole cut into material that allows the head of a fastener to sit flush with the surface of the material. Flush head fasteners improve aerodynamics, prevent trip hazards, and allow parts to be placed next to each other with no interference.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the common reasons for countersinking a hole
- Identify the different types of countersink cutters
- Understand how countersinks are identified
- Describe the purpose of a microstop countersink tool
- Describe the proper technique for countersinking a hole
- Understand the proper way to use a countersink gauge

Estimated completion time (hours): 1.3

THREADS, TAPS AND DIES

CUT-2004 THREADS

Course Description

Threads are one of the most common mechanical forms used to join parts. Understanding the terms associated with threads is important for anyone working with fasteners and other parts with threads.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define pitch
- Define TPI
- Identify the sections of a 60 degree thread form
- List common fastener thread series

Estimated completion time (hours): 1.3

CUT-2005 TAPS

Course Description

Taps are one of the most common tools used to produce internal threads in parts. Understanding the types of taps and their applications is important for anyone working in manufacturing.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify a hand tap
- Identify a helical tap
- Identify the sections of a tap
- Understand the markings on a tap

Estimated completion time (hours): 1.5

CUT-2006 HAND TAPPING

Course Description

Hand tapping is a common method of manually tapping a few holes or repairing damaged internal threads. Understanding this process is important for anyone working with parts with internal threads.

Learning Objectives

By the end of this course, you will be able to do the following:

- List types of tap wrenches
- List proper cutting fluids for tapping different materials
- Understand the process of hand tapping

Estimated completion time (hours): 1.4

CUT-2007 THREADING DIES

Course Description

A threading die is a tool used to create or repair external threads. Understanding the different types of threading dies and their uses is important for anyone in manufacturing.

Learning Objectives

By the end of this course, you will be able to do the following:

- List types of threading dies
- List the parts of an adjustable threading die
- Understand the process of repairing a thread with a threading die

Estimated completion time (hours): 1.4

LUBRICANTS AND CUTTING FLUIDS

CUT-2008 CUTTING FLUIDS

Course Description

Cutting fluids are vital to the success of most machining operations on CNC machines. It is important to understand the properties and proper maintenance of the various cutting fluids.

Learning Objectives

By the end of this course, you will be able to do the following:

- Distinguish between cutting oil, soluble oil, and synthetic cutting fluids
- List properties of cutting oils
- List properties of synthetic cutting fluids
- List properties of soluble oil
- List ingredients in soluble oils
- Understand how to use a refractometer

Estimated completion time (hours): 1.5

CUTTING TOOLS FOR METALWORKING COURSES

CUT-2009 CUTTING TOOL MATERIALS

Course Description

Many different types of cutting tool material are available, and how they interact with whatever you’re cutting plays a key role in the success of a machining operation. In this course, you will discover the most common cutting tool types and materials. You will also find out the importance of balancing speed and feedrate, as well as the key attributes of each type of material.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define speed and feed
- List common cutting tool materials
- Identify uses of common cutting tool materials
- List the attributes of common cutting tool materials
- Understand the purpose of coatings on cutting tools
- Understand the term carbide grade

Estimated completion time (hours): 1.2

CUT-2010 INDEXABLE TOOL HOLDERS

Course Description

Several machining operations can use indexable tools. In this course, you’ll learn the difference between indexable turning tool holders and indexable boring bar holders. You’ll also discover the ins and outs of the ANSI and ISO turning tool and boring bar identification systems.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify machining operations that can use indexable tools
- List the areas of a shank-type indexable turning tool holder
- List the components of the insert clamping system
- Identify the meanings of positions in the ANSI and ISO turning tool identification system
- Define the inscribed circle of an insert

Estimated completion time (hours): 2.1

CUT-2011 INSERTS

Course Description

Many different types of inserts exist. Fortunately, many inserts are versatile, and you can use them for multiple tasks. In this course, you’ll discover the common insert shapes for CNC lathes. You’ll also learn what each position in the insert identification system specifies.

Learning Objectives

By the end of this course, you will be able to do the following:

- List common shapes of inserts used for turning
- List common shapes of inserts used for milling
- Understand the importance of the tool nose radius
- Understand the ANSI insert identification system
- Define chipbreaker

Estimated completion time (hours): 1.2

CUT-2012 SOLID CUTTING TOOLS

Course Description

Solid cutting tools are widely used in CNC lathes and machining centers. Understanding the terms associated with these tools and how a tool is selected is important information for all CNC team members.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify terms associated with solid cutting tools
- Distinguish between right- and left-hand cutting tools
- Define straight and helical flutes
- Distinguish between right- and left-hand helical flutes
- List the categories of drill lengths
- Understand the size markings of drills
- Understand the markings on taps
- Understand the uses of right- and left-hand helix cutting tools

Estimated completion time (hours): 1.9

ELECTRICAL COURSES

INTRODUCTION TO ELECTRICITY

ELE-1001 PRODUCTION OF ELECTRICITY

Course Description

Electricity is a part of modern everyday life. Understanding the methods of producing electricity can lead to a greater appreciation of its importance.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the term energy
- List methods to produce electricity
- Understand the concept of conservation of energy
- List several forms of energy
- Understand the difference between kinetic and potential energy

Estimated completion time (hours): 1.7

ELE-1002 TRANSMISSION AND DISTRIBUTION OF ELECTRICITY

Course Description

The methods to transmit and distribute electricity produced in power plants are important to understand the complete electrical network.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define voltage
- List the types of substations
- Define a substation
- Understand the difference between step-up and step-down substations

Estimated completion time (hours): 1.1

ELE-1003 USES OF ELECTRICITY

Course Description

Electricity is used in almost every facet of our lives. Understanding the many different ways it is used is important to realizing its importance as a source of energy.

Learning Objectives

By the end of this course, you will be able to do the following:

- List industrial applications of electricity
- List ways electricity is used in households
- Understand how electricity is used in transportation
- Understand the medical applications of electricity

Estimated completion time (hours): 1.2

ELE-1004 ATOMIC STRUCTURE

Course Description

The foundation to understanding electricity begins with the atom. Identifying the parts of an atom and their characteristics will help you understand the origin and flow of electricity.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the parts of an atom
- Define charge
- Define coulomb
- Understand the difference in the atomic structure of conductors and insulators
- List some conductors and insulators

Estimated completion time (hours): 0.8

ELE-1005 ELECTRICAL CIRCUITS

Course Description

Knowing the types and parts of electrical circuits is important in understanding the flow of electricity.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the parts of a circuit
- List the differences between series, parallel, and combination circuits
- Understand the difference between open and closed circuits

Estimated completion time (hours): 0.8

ELE-1006 ELECTRICAL CURRENT

Course Description

Understanding the term electrical current and how it is measured is important to anyone working with electricity.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the term for measuring the flow of electricity
- List the prefixes associated with units of measure
- Understand the relationship between current and coulomb
- Understand how an ammeter must be installed in a circuit

Estimated completion time (hours): 0.8

ELE-1007 VOLTAGE

Course Description

Understanding the term voltage and how it is measured is important to anyone working with electricity.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the term voltage
- Understand the relationship between current and voltage
- Understand how a voltmeter must be installed in a circuit

Estimated completion time (hours): 0.7

ELE-1008 ELECTRICAL POWER

Course Description

Understanding the term electrical power and how it is measured is important to anyone working with electricity.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the term electrical power
- Understand the relationship between electrical power, current, and voltage
- Understand how a wattmeter must be connected in a circuit

Estimated completion time (hours): 0.7

ELE-1009 RESISTANCE

Course Description

The resistance in a circuit determines the amount of voltage required in the circuit and the amount of current the circuit will carry. Understanding the relationship of resistance to other electrical characteristics is important to anyone working with electricity.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the term resistance
- Understand the relationship between current, voltage, and resistance
- Understand how an ohmmeter must be connected
- Identify types of resistors
- Recognize the color codes for resistors

Estimated completion time (hours): 0.9

ELE-1010 OHM’S LAW

Course Description

Ohm’s law is the mathematical representation of the relationship between voltage, current, and resistance in an electrical circuit. Understanding how to apply Ohm’s law is important for anyone working with electrical circuits.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define Ohm’s law
- Apply Ohm’s law to calculate unknown electrical values

Estimated completion time (hours): 0.7

ELE-1011 WATT’S LAW

Course Description

Watt’s law is the mathematical representation of the relationship between power, current, and voltage in an electrical circuit. Understanding how to apply Watt’s law is important for anyone working with electrical circuits.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define Watt’s law
- Apply Watt’s law to calculate unknown electrical values
- Combine Watt’s law and Ohm’s law to calculate unknown electrical values

Estimated completion time (hours): 0.8

DC ELECTRICITY
ELE-1012 DIRECT CURRENT

Course Description
Direct current is used to power everything from cell phones to trains. Understanding this form of electrical flow is important to anyone working with electricity and electronics.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define direct current
 - Understand the difference between conventional and electron flow theories
 - List different types of direct current

Estimated completion time (hours): 0.7

ELE-1013 BATTERIES

Course Description

Batteries are a common power source of direct current. Connecting batteries together can increase the voltage or current supplied to a circuit.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define cell
 - Define battery
 - Understand how to connect cells or batteries to increase voltage
 - Understand how to connect cells or batteries to increase current

Estimated completion time (hours): 0.7

ELE-1014 CIRCUIT ANALYSIS

Course Description

The resistance, voltage, and current in a circuit depend upon the type of circuit. Understanding how to calculate the values for resistance, voltage, and current for each type of circuit is important for anyone working with electricity and electronics.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify a node
 - Identify a junction
 - Identify a loop
 - Calculate total resistance in a series, parallel, or combination circuit
 - Understand Kirchhoff’s voltage and current laws

Estimated completion time (hours): 1.6

AC ELECTRICITY
ELE-1015 ELECTROMAGNETISM

Course Description
Understanding the relationship between electricity and magnetism is important in understanding the way many electrical components function.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define electromagnetism
 - Define electromagnetic induction

Estimated completion time (hours): 1.1

ELE-1016 AC WAVEFORM GENERATION

Course Description
Magnetism is used to produce alternating current (AC). Knowing how AC is produced is important in understanding the way many electrical devices operate.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define a wave cycle
 - Define frequency
 - Understand how an AC waveform is produced

Estimated completion time (hours): 0.7

ELE-1017 ELECTROMAGNETIC DEVICES

Course Description

The electromagnetic property of a coil of wire carrying current has many uses in electrical circuits. Understanding this property is important in understanding the way many electrical devices operate.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define inductor
 - Identify the symbols for inductors, solenoids, and relays
 - Understand how an inductor can limit current
 - Understand how a solenoid operates
 - Understand how a relay operates

Estimated completion time (hours): 1.0

ELE-1018 TRANSFORMERS

Course Description

A common electrical device used in industrial facilities is the transformer. Identifying the components and functions of a transformer are important to anyone working with electricity.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify the components of a transformer
 - Identify the functions of a transformer
 - Understand the relationship between the primary and secondary coils of a transformer
 - Identify the type of transformer by the ratio of turns of the conductor on the coils

Estimated completion time (hours): 0.9

ELE-1019 CAPACITORS

Course Description

A capacitor is one of the few electrical devices capable of storing electrical energy in a circuit. Identifying the components and functions of a capacitor are important to anyone working with these devices.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify the components of a capacitor
 - Identify the functions of a capacitor
 - Define capacitance
 - Identify the unit of measure of capacitance

Estimated completion time (hours): 0.8

SOLID STATE ELECTRICITY
ELE-1020 SEMICONDUCTORS

Course Description
Semiconductors are materials that are used extensively as the materials in electronic circuit devices. Knowledge of these materials will help in your understanding of the devices that are made from these materials.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define a semiconductor
 - Define an N-type material
 - Define a P-type material
 - List some trivalent elements
 - List some pentavalent elements

Estimated completion time (hours): 0.9

ELE-1021 SOLID STATE DEVICES

Course Description

Solid state devices are used in most electronic devices. Understanding how these devices function is important to anyone working with electronic circuits.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify symbols for diodes, rectifiers, and transistors
 - Understand the importance of P-type and N-type materials in solid state devices
 - Understand how a diode functions
 - Understand how a rectifier functions
 - List different types of power supplies

Estimated completion time (hours): 1.4

INTRODUCTION TO WIRING
ELE-2001 WIRES, CONNECTORS, AND CIRCUIT PROTECTION

Course Description
Wires, connectors, and circuit protection are important components of an electrical circuit. Understanding these components is important for anyone working with electricity.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List different types of grounds
 - List different types of connectors
 - Understand wire sizes
 - List different methods of joining wires and connectors
 - List different methods of circuit protection

Estimated completion time (hours): 1.5

ELE-2002 CONNECTING TRANSFORMERS

Course Description
Understanding the different methods of connecting transformers is important for all people working with electricity in any industry.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define phase
 - Understand the difference between single- and three-phase power
 - Understand how single-phase transformers are connected in series and parallel
 - Understand how the coils in three-phase transformers are connected
 - Understand the difference between delta and wye configurations

Estimated completion time (hours): 1.2

INTRODUCTION TO ELECTRIC MOTORS
ELE-2003 DC MOTORS

Course Description
Electric motors that operate on direct current are used in everything from children’s toys to the Mars Exploration Rover. Understanding the types and components of a DC motor is important for anyone working with electric motors.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List types of DC motors
 - List common parts of a DC motor
 - Define a series connected wound motor
 - Define a shunt connected wound motor
 - Define a compound connected wound motor

Estimated completion time (hours): 1.4

ELE-2004 AC SINGLE-PHASE MOTORS

Course Description
Electric motors that operate on single-phase alternating current are used in most kitchen appliances and many low power industrial machines. Understanding the types of single-phase AC motors is important for anyone working with electric motors.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List types of single-phase AC motors
 - Define a split-phase motor
 - Define a capacitor start motor
 - Define a capacitor run motor

Estimated completion time (hours): 0.7

ELE-2005 THREE-PHASE AC MOTORS

Course Description
Electric motors that operate on three-phase alternating current are used in many industrial machines that require high horsepower. Understanding how a three-phase AC motor operates is important for anyone working with electric motors.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Understand how a three-phase motor operates
 - Understand how to connect a three-phase motor with a wye configuration
 - Understand how to connect a three-phase motor with a delta configuration

Estimated completion time (hours): 0.9

ELECTRICAL CONNECTORS
ELE-2006 ELECTRICAL CONNECTORS AND FASTENERS

Course Description
This course introduces electrical connectors and reviews several types of mechanical fasteners used in the installation of wire bundles in an airplane.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List the components of a wire bundle
 - Understand the function of each component of a wire bundle
 - Recognize different types of mechanical fasteners
 - Understand the function of each type of mechanical fastener

Estimated completion time (hours): 1.3

FIBER OPTICS
ELE-2007 FIBER OPTICS AND LIGHT

Course Description
The continuous process of improving the performance and comfort of modern airplanes requires the use of lighter and more efficient materials. The replacement of copper wire with lighter and smaller glass fiber is possible in some areas of modern airplanes.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Understand how light and optic fiber is measured
 - List forms of electromagnetic radiation
 - Identify the parts of a fiber optic system
 - Define frequency
 - Define wave length
 - List the components of an optic fiber
 - Understand how light behaves as it travels through different materials

Estimated completion time (hours): 1.9

ELE-2008 MANUFACTURING OPTICAL FIBER

Course Description
The process of manufacturing optical fiber is critical to a properly functioning fiber optic system. Learning how optical fiber is manufactured is important in understanding how light is transmitted through the fiber.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define preform
 - Understand how a preform is manufactured
 - Define tensile strength
 - List properties of an optical fiber that are tested

Estimated completion time (hours): 1.1

ELE-2009 FIBER OPTIC CABLE

Course Description
Fibers require the strength provided by the layers of a cable to withstand the forces of installation and nature. Identifying the types of fiber optic cables is important for anyone working with fiber optic systems.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define a single-mode fiber
 - Define a multi-mode fiber
 - Identify the layers of a fiber optic cable
 - List types of fiber optic cables

Estimated completion time (hours): 0.9

ELE-2010 HANDLING FIBER OPTIC CABLE

Course Description
The proper handling of a fiber optic cable is critical to the performance of the cable. Properly handling fiber optic cables is important for anyone working with fiber optic systems.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define FOD
 - Calculate the minimum bend radius for a fiber optic cable
 - Understand how to properly handle fiber optic cable
 - Understand the importance of dust caps

Estimated completion time (hours): 0.8

ELE-2011 QUALITY AND SAFETY

Course Description
The quality of a fiber optic cable and its installation are critical to the performance of the fiber optic system. Understanding the risks of working with fiber optic cables is important to ensure the personal safety of anyone working with fiber optics.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List defects of a fiber optic cable
 - List the tasks performed on fiber optic cables that require certification
 - Understand your responsibility if you find a damaged cable
 - Understand the risks of working with fiber optic cables

Estimated completion time (hours): 0.7

SENSOR TECHNOLOGY
ELE-2012 INTRODUCTION TO SENSORS TECHNOLOGY

Course Description
Sensors are the communication managers of automated industrial systems. They collect information about the environment and convert this information into a format that can be used by the system. Sensor selection depends upon what information the automated system needs to acquire.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define sensors
 - List the primary types of sensors
 - Categorize sensors based upon their capabilities
 - Understand the role of sensors in automated industrial systems
 - List some typical applications of sensors in automated industrial systems

Estimated completion time (hours): 1.4

ELE-2013 SENSOR TECHNOLOGY

Course Description

Sensors have several properties and characteristics that affect their ability to detect and measure the environment and convert this information into a quantitative measurement. Understanding these characteristics will help you select the correct sensor for your application.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Identify the characteristics of a sensor
 - Explain how each characteristic impacts sensor performance
 - Describe the criteria to be considered for selecting a sensor

Estimated completion time (hours): 1.2

ELE-2014 PROXIMITY SENSORS

Course Description

Proximity sensors are typically designed to determine if an object is near and to communicate that information to another device in an automated system. Some proximity sensors simply detect if an object is present or absent, while others can measure the distance to the object. Other proximity sensors can even detect the color of an object.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Understand proximity sensors
 - Identify the different types of proximity sensors
 - Understand the function of proximity sensors
 - List some typical applications of proximity sensors
 - Understand the symbology for proximity sensors

Estimated completion time (hours): 1.4

ELE-2015 POSITION, SPEED AND ACCELERATION SENSORS

Course Description

Position, speed, and acceleration sensors make it possible to move automated system components in complex ways. Controlling speed, position, and acceleration increases the efficiency of these systems as well.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Identify the types of position sensors
 - Understand the functions and features of position sensors
 - Identify the types of speed sensors
 - Understand the functions and features of speed sensors
 - Identify the types of acceleration sensors
 - Understand the functions of features of acceleration sensors
 - Recognize some typical applications of position, speed, and acceleration sensors

Estimated completion time (hours): 1.7

ELE-2016 INDUSTRIAL PROCESS SENSORS

Course Description

Industrial process sensors are designed to monitor conditions of a process that are variable, such as pressure, temperature, level, and flow. These sensors enable an automated system to control complex tasks, such as mixing, filling, heating, and cooling.

Learning Objectives

- By the end of this course, you will able to
- Describe the different types of process control sensors
 - Describe common applications of process control sensors
 - Differentiate between mechanical and electromechanical sensors
 - Understand how a strain gauge functions

Estimated completion time (hours): 1.6

ELE-2017 ADVANCED SENSORS

Course Description

Many of the sensors you encounter in everyday life, such as barcode readers at retail stores, are also used in industrial processes. Understanding the uses of these advanced sensors is important for individuals working in these industries.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Identify different types of advanced sensors used in industrial applications
 - Describe the uses of barcode readers
 - Define the main components of a barcode reader
 - Describe the uses and types of radio frequency identification
 - Describe the uses and types of vision sensors
 - Describe the uses and types of laser sensors
 - Identify typical applications of some advanced sensors

Estimated completion time (hours): 1.6

ELECTRICAL HAND TOOLS
ELE-2018 HAND TOOLS FOR ELECTRICAL WIRING

Course Description

Installing wire bundles in an airplane requires the use of many different hand tools. Knowledge of the tools and their usage is valuable for the assembly electrician.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Understand the tools used to install wire bundles
 - List some of the parts of these tools
 - Understand the proper use of the tools

Estimated completion time (hours): 1.5

ELECTRICAL MEASUREMENT CONVERSION
ELE-2019 ELECTRICAL MEASUREMENT AND UNIT CONVERSION

Course Description
Measuring resistance is done with sophisticated electronic equipment. Understanding measurement values and being able to convert them to other units of measure is a critical skill in the aviation industry.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Explain how resistance is measured
 - Demonstrate converting ohms to other units of measure
 - List all of the units of measure for ohms
 - Explain the fundamental rules for unit conversion

Estimated completion time (hours): 0.9

ELECTRICAL RESISTANCE TEST EQUIPMENT
ELE-2020 RESISTANCE TEST EQUIPMENT

Course Description
Ohmmeters and multimeters check resistance in a variety of airplane locations. Some of these areas may be hazardous. In this course, you will learn how to avoid potential danger when testing resistance.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Explain the potential hazards of resistance testing
 - List the correct ohmmeter to use in hazardous areas
 - List the correct ohmmeters and multimeters to use in non-hazardous areas
 - Define the equipment inspection steps you must perform before using an ohmmeter or multimeter

Estimated completion time (hours): 0.7

ELE-2021 THE FLUKE® MULTIMETER

Course Description
The Fluke multimeter is an electronic device used to test electrical circuits and to troubleshoot electronic components.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List the major components of the Fluke multimeter
 - Explain how to prepare the Fluke multimeter for resistance testing
 - Use the Fluke multimeter to test resistance

Estimated completion time (hours): 0.9

ELE-2022 THE BIDDLE® OHMMETER

Course Description
The Biddle ohmmeter is an electronic device used to test electrical circuits and to troubleshoot electronic components.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List the major components of the Biddle ohmmeter
 - Explain how to prepare the Biddle ohmmeter for resistance testing
 - Use the Biddle ohmmeter to test resistance

Estimated completion time (hours): 0.8

ELE-2023 THE AVTRON® OHMMETER

Course Description
The Avtron ohmmeter is an electronic device used to test electrical circuits and to troubleshoot electronic components.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List the major components of the Avtron ohmmeter
 - Explain how to prepare the Avtron ohmmeter for resistance testing
 - Use the Avtron ohmmeter to test resistance

Estimated completion time (hours): 0.7

ELE-2024 THE HEWLETT PACKARD® MILLIOHMMETER

Course Description
The Hewlett Packard milliohmmeter is an electronic device used to test electrical circuits and to troubleshoot electronic components.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List the major components of the Hewlett Packard milliohmmeter
 - Explain how to prepare the Hewlett Packard milliohmmeter for resistance testing
 - Use the Hewlett Packard milliohmmeter to test resistance

Estimated completion time (hours): 0.8

ELE-2025 THE BCD M1® OHMMETER

Course Description
The BCD M1 ohmmeter is an electronic device used to test electrical circuits and to troubleshoot electronic components.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List the major components of the BCD M1 ohmmeter
 - Explain how to prepare the BCD M1 ohmmeter for resistance testing
 - Use the BCD M1 ohmmeter to test resistance

Estimated completion time (hours): 0.9

CRIMPING TERMINALS AND SPLICES
ELE-4001 TERMINALS AND SPLICES

Course Description
Wires in an airplane may need to be attached to the structure or the equipment, or they may need to be joined together. Special components called terminals are used to attach the wire. Splices are used to join wires.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- List the parts of a terminal
 - List the parts of a splice
 - Understand the difference between butt and parallel splices
 - Understand the meaning of restricted entry terminal
 - Understand the meaning of multiple conductor terminal

Estimated completion time (hours): 1.0

ELE-4002 CRIMPING

Course Description

Understanding how to attach a terminal or splice to wires is important for assembly electricians to correctly install wire bundles. It is also important that the assembly electrician selects the correct size terminal or splice for different sizes of wires.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the measurement unit CAU
- Select terminal and splice sizes based on the CAU of wires
- List the parts of a terminal crimping tool
- Understand the importance of the location of a crimp

Estimated completion time (hours): 1.5

ELE-4003 CRIMPING A TERMINAL

Course Description

Correctly installing wire bundles requires an understanding of how to attach a terminal or splice to wires.

Learning Objectives

By the end of this course, you will be able to do the following:

- Select the correct size terminal for the wires
- Determine the correct length to strip wires
- Select the correct crimping tool
- Determine the correct setting for the insulation crimping adjustment pin

Estimated completion time (hours): 1.3

ELE-4004 CRIMPING A PRE-INSULATED SPLICE

Course Description

Knowing how to select a pre-insulated splice, prepare the wires, and crimp the splice onto the wires is critical to a successful electrical installation.

Learning Objectives

By the end of this course, you will be able to do the following:

- Select the correct size splice for the wires
- Determine the correct length to strip wires
- Select the correct crimping tool
- Determine the correct setting for the insulation crimping adjustment pin
- Calculate the size of additional material needed to build up a wire to meet the minimum CAU of a splice

Estimated completion time (hours): 1.6

ASSEMBLY OF COAXIAL CONNECTORS

ELE-4005 COAXIAL CABLE

Course Description

Radio communication is critical to the safe operation of an airplane. Special cables called coax cables are often used to provide static-free radio communications.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the parts of a coax cable
- List some types of coax cables
- Understand the history of coax cable

Estimated completion time (hours): 0.8

ELE-4006 COAXIAL CONNECTORS

Course Description

Coax cables require special connectors to connect to the equipment. Knowledge of the required connection components is important for the installation of coax cables.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the components required to connect a coax cable to equipment
- List methods to install contacts
- List the different types of mountings for coax cable connectors

Estimated completion time (hours): 1.0

ELE-4007 COAXIAL CONNECTOR TOOLS

Course Description

Coax cables and connectors require special tools for their assembly. Knowledge of these tools is important for the installation of coax cables and connectors.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the tools required to install coax connectors on a cable
- List the parts of a coax stripping tool
- List the parts of an outer sleeve crimping tool
- List the parts of a contact crimping tool

Estimated completion time (hours): 1.3

ELE-4008 COAXIAL CONNECTOR ASSEMBLY

Course Description

This course allows you to prepare a coax cable, crimp a contact, and crimp a coaxial connector.

Learning Objectives

By the end of this course, you will be able to do the following:

- Determine the correct length to strip the sections on a coax cable
- Select the correct size connector
- Set the contact crimping tool to the correct settings

Estimated completion time (hours): 1.7

ENGINEERING DRAWINGS COURSES

BLUEPRINT READING FUNDAMENTALS

DWG-1001 INTRODUCTION TO BLUEPRINTS

Course Description

A blueprint is the primary means of communicating the requirements of a product to all those involved in manufacturing or building the product. Understanding how to read and interpret a blueprint is a universal skill that is used in almost every industry.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the purpose of blueprints
- List other terms used for blueprints
- Describe methods of creating an engineering drawing
- Explain the purpose and contents of a title block
- Explain the importance of standards for engineering drawings

Estimated completion time (hours): 1.7

DWG-1002 ENGINEERING DRAWING TERMINOLOGY

Course Description

Words and phrases you use in everyday conversation have different meanings when applied to reading an engineering drawing. In this course, you will learn the meanings of words and phrases as they apply to engineering drawings. You will also learn to recognize and identify lines, shapes, and angles used in engineering drawings.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the basic shapes used in engineering drawings
- Identify types of lines shown on engineering drawings
- Identify the angle types seen on engineering drawings
- Explain the relationships that exist between two or more lines
- Explain the relationships that exist between two or more circles
- Explain the relationships between lines, circles, and angles

Estimated completion time (hours): 1.5

DWG-1003 ENGINEERING DRAWING VIEWS

Course Description

The key to reading an engineering drawing is understanding how to visually interpret product illustrations. In this course, you will learn how the views on an engineering drawing are arranged and how to draw a three-dimensional object on a two-dimensional surface.

Learning Objectives

By the end of this course, you will be able to do the following:

- Determine the number of views required to define an object
- Explain the difference between isometric and orthographic drawings
- Describe the “glass box” method of illustrating views on an engineering drawing
- Interpret engineering drawings when shown an object
- Explain how views are arranged in a multiview drawing
- Identify views on an engineering drawing
- Describe the purpose of a sectional view
- Describe the function of cutting planes
- Define how front views are selected

Estimated completion time (hours): 1.6

DWG-1004 ENGINEERING DRAWING LINES

Course Description

There are many types of lines used to define the shape of an object on an engineering drawing. Each type has a specific function in the definition of the object.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify each type of line used in an engineering drawing
- Describe the function of three line types used in an engineering drawing: visible, hidden, and center
- Describe the function of line precedence
- Identify line types given an engineering drawing
- Interpret hidden features on an engineering drawing
- Interpret views from viewing planes

Estimated completion time (hours): 1.3

DWG-1005 DIMENSIONS AND TOLERANCES

Course Description

Dimensions and tolerances are used to define the required distances between lines, planes, and points on an object.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a feature
- Define a feature of size
- Describe the function of dimensions and tolerances on an engineering drawing
- Describe, identify, and interpret linear dimensions
- Describe, identify, and interpret dimensions for circular features
- Describe, identify, and interpret dimensions for angular features
- Describe basic rules for dimensioning an engineering drawing
- Describe different features of holes and their symbols

Estimated completion time (hours): 2.1

BLUEPRINTS AND PICTURE SHEETS FOR AEROSPACE

DWG-1006 AEROSPACE INTRODUCTION TO BLUEPRINTS

Course Description

Blueprints are the road map for transforming materials into finished products. Understanding how to read and interpret a blueprint is a universal skill that is used in almost every industry.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the history of blueprints
- Define the language of blueprints
- List the types of blueprints
- Explain why blueprints are standardized

Estimated completion time (hours): 1.4

DWG-1007 BLUEPRINT TERMINOLOGY

Course Description

Some words and phrases you use in everyday conversation have different meanings when applied to blueprint reading. In this course, you will learn the meanings of words and phrases as they are used on blueprints.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the basic shapes used on blueprints
- Identify line types used on blueprints
- Identify the angle types you will see on blueprints
- Explain the relationships that exist between two or more lines
- Explain the relationships that exist between two or more circles

Estimated completion time (hours): 1.4

DWG-1008 BLUEPRINT VIEWS

Course Description

The key to blueprint reading is understanding how to visually interpret product illustrations. In this course, you will learn how blueprints are drawn and how to see a three-dimensional object on a two-dimensional surface.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain how blueprints are drawn
- Explain the difference between perspective, isometric, and orthographic drawings
- Define each of the orthographic views on a blueprint
- Visualize three-dimensional objects drawn as two-dimensional objects

Estimated completion time (hours): 2.0

DWG-1009 BLUEPRINT LINES

Course Description

The picture area of a blueprint is the engineer’s answer to a design problem. The engineer puts the answer on a drawing using lines and symbols that are common to the industry. In this course, you will learn how to read and interpret the lines on a blueprint.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify each type of line used in a blueprint drawing
- Interpret a product based upon a line drawing
- Interpret hidden features on a blueprint drawing
- Identify other views of the product on the blueprint drawing

Estimated completion time (hours): 1.3

DWG-1010 BLUEPRINT DIMENSIONS AND TOLERANCES

Course Description

Dimensions and tolerances are used to define the distances between lines, planes, and symbols on a blueprint. In this course, you will learn how dimensions and tolerances make it possible to mass produce products with extraordinary levels of consistency and accuracy.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the different types of dimensions
- Identify the different types of tolerances
- Explain the purpose of dimension lines and extension lines
- Identify tolerancing methods
- Calculate tolerances

Estimated completion time (hours): 1.6

DWG-1011 BLUEPRINT SYMBOLS

Course Description

Blueprints have unique standardized symbols that are used to communicate additional information about the product. Recognizing these symbols and their meanings is the final step to effectively reading blueprints.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the product datum
- List the categories of blueprint symbols
- Identify the most common symbols used on blueprints
- Identify the type of fastener specified on a blueprint
- Locate product feature symbols on a product drawing

Estimated completion time (hours): 1.6

ADVANCED BLUEPRINT READING
DWG-2001 GEOMETRIC DIMENSIONS AND TOLERANCES

Course Description

Size dimensions can often restrict a feature more than is needed. When the shape or form of a feature is more important than its size, a geometric dimension and tolerance is typically used.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define maximum and least material conditions
- List the five geometric characteristic categories
- Identify geometric characteristic symbols
- Define a datum and datum feature
- Describe, identify, and interpret dimensions for angular features
- Identify the sections of a feature control frame
- Describe where datum feature symbols are located on an engineering drawing

Estimated completion time (hours): 1.4

DWG-2002 ASSEMBLIES AND FITS

Course Description

The ability to read an assembly drawing and identify the components is important to many people working in manufacturing. It is also important to understand how dimensions and tolerances affect how easily the components should assemble or fit together.

Learning Objectives

By the end of this course, you will be able to do the following:

- List and describe two methods of displaying an assembly in an engineering drawing
- Interpret an assembly drawing
- Define the types of fits
- Determine the type of fit between two mating parts

Estimated completion time (hours): 1.0

DWG-2003 THREADS AND FASTENERS

Course Description

Threaded fasteners are frequently used in assemblies. Understanding the terms associated with threads and threaded fasteners is important for anyone working with fasteners and other parts with threads.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the function of a threaded fastener
- Identify the basic characteristics of a thread
- Describe how to specify threaded fasteners
- Identify the size and type of fastener given an example
- Define the grades of bolts
- Identify the grade of a bolt

Estimated completion time (hours): 1.3

AEROSPACE WIRE INSTALLATION DRAWINGS

DWG-2004 ENGINEERING DRAWING REVIEW

Course Description

Engineering drawings are used in almost every industry. Understanding how to read and interpret an engineering drawing is a valuable skill.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the main areas of an engineering drawing
- Define the different engineering drawing views
- Understand the difference between and orthographic projection drawing and an isometric drawing

Estimated completion time (hours): 0.9

DWG-2005 WIRE BUNDLE INSTALLATION PAPERWORK

Course Description

There are a number of engineering documents needed for a wire bundle installation.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify a course
- Understand the course numbering system
- Identify a course parts list
- Read and interpret a course parts list
- Recognize the different sections of an installation plan
- Understand how to use an installation plan on a shop floor
- Understand the function of the Airplane Specific Configuration Table

Estimated completion time (hours): 1.1

DWG-2006 ELECTRICAL PRODUCTION ILLUSTRATIONS

Course Description

Electrical production illustration drawings are a visual representation of the electrical wiring path in an airplane.

Learning Objectives

By the end of this course, you will be able to do the following:

- Recognize several different types of engineering drawings, including
- Electrical Area Breakdown Drawings
- General Notes Drawings
- Electrical Production Installation Drawings
- List the sections of an electrical production illustration drawing
- Understand what the symbols found on production illustration drawings represent
- Understand the purpose of the tables found on an electrical production illustration drawing picture sheet
- Read an electrical production illustration drawing

Estimated completion time (hours): 1.4

COMPOSITE ENGINEERING DRAWINGS AND INSTRUCTIONS

DWG-2007 ENGINEERING COMMUNICATION

Course Description

Manufacturing a product requires a great amount of communication among all the people involved. Much of the communication must come from engineers. Engineers use a variety of methods to communicate this required information.

Learning Objectives

By the end of this course, you will be able to do the following:

- List methods engineers use to communicate design requirements
- List methods engineers use to communicate manufacturing requirements

Estimated completion time (hours): 1.5

DWG-2008 COMPOSITE ENGINEERING DRAWINGS

Course Description

Understanding the information contained on an engineering drawing for a composite product is critical to successfully manufacturing the product. In this course, you'll learn how to decipher this information.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify common components of an engineering drawing for composite parts
- Distinguish between flag notes and general notes
- Identify the information found in ply tables
- Identify the information in splice control tables

Estimated completion time (hours): 1.1

DWG-2009 WORK INSTRUCTIONS

Course Description

In composite manufacturing, work instructions are used extensively for kitting, completing layups, curing, and machining or trimming. Work instructions enable you to produce a quality composite part.

Learning Objectives

By the end of this course, you will be able to do the following:

- Relate work instructions to an engineering drawing
- Understand why work instructions are needed to provide necessary information

Estimated completion time (hours): 1.1

GEOMETRIC DIMENSIONING AND TOLERANCING (GD&T)

DWG-3001 INTRODUCTION TO GD&T

Course Description

Engineering detail drawings communicate design intent along the entire supply and production line to ensure that mechanical parts meet a desired form, fit, and function.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the history of theY14.5 standard
- Define the purpose of an engineering detail drawing
- Define the terms dimension, tolerance, and geometric tolerance

Estimated completion time (hours): 0.9

DWG-3002 GD&T TERMS AND SYMBOLS

Course Description

There are many terms and symbols unique to engineering drawings. Understanding these terms and symbols is important in understanding the design intent of the part represented on the drawing.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand how different units of measure are represented on engineering drawings
- Define the symbols used on engineering drawings
- Identify the components of a dimension
- List locations of dimensions
- Define a reference dimension
- Define a basic dimension

Estimated completion time (hours): 1.5

DWG-3003 RULES OF GD&T

Course Description

ASMEY14.5 requires engineering drawings to be created and interpreted to a set of rules. Understanding these rules is important to understanding the design intent of a part.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand Rule #1 of GD&T
- List tolerance zone shapes
- Define size
- Define the local size of a feature of size
- Define actual mating size
- Understand the implied 90-degree rule
- Understand how to apply general, or block, tolerances

Estimated completion time (hours): 2.0

DWG-3004 GEOMETRIC TOLERANCES

Course Description

Engineers use geometric tolerances to convey the design intent of the form or location of features when size tolerances may be too restrictive.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the geometric characteristics controlled by geometric tolerances
- Identify the symbols used in geometric tolerances
- Identify a feature control frame
- Identify the tolerance area of a feature control frame
- Identify the geometric characteristic area of a feature control frame
- Identify the datum references area of a feature control frame
- Identify a basic dimension

Estimated completion time (hours): 1.6

DWG-3005 DATUMS

Course Description

Datums are the foundation that provides a method of aligning geometric tolerance zones to ensure features meet their intended design.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a datum
- Define a datum feature
- Identify a datum feature symbol
- Define a simulated datum
- Define a datum reference frame
- Identify a datum target symbol
- Understand the importance of the order of precedence of datums

Estimated completion time (hours): 1.4

DWG-3006 FORM TOLERANCES

Course Description

Form geometric tolerances are used frequently to control shapes of individual features of parts. Understanding the tolerance zone created by a form geometric tolerance is important for anyone involved in manufacturing.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify a tolerance zone for a straightness geometric tolerance
- Identify a tolerance zone for a circularity geometric tolerance
- Identify a tolerance zone for a cylindrical geometric tolerance
- Identify a tolerance zone for a flatness geometric tolerance

Estimated completion time (hours): 1.0

DWG-3007 PROFILE TOLERANCES

Course Description

Profile geometric tolerances are used to define the limits of contours of lines and surfaces containing straight lines, arcs, partial cylinders, and even mathematically defined curves.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a tolerance zone for a profile of a line
- Define a tolerance zone for the profile of a surface
- Understand unilateral profile tolerancing
- Understand bilateral profile tolerancing

Estimated completion time (hours): 0.9

DWG-3008 ORIENTATION TOLERANCES

Course Description

Orientation tolerances control the alignment of features to datum features. Orientation tolerances control the angularity, parallelism, and perpendicularity of features.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the tolerance zones for the perpendicularity of a plane or axis
- Define the tolerance zones for the angularity of a plane or axis
- Define the tolerance zone for the parallelism of planes or an axis
- Understand the application of the qualifying notation: “EACH RADIAL ELEMENT”
- Understand the application of a projected tolerance zone
- Understand the characteristic of a thread, or gear, to which a geometric tolerance applies

Estimated completion time (hours): 1.2

DWG-3009 RUNOUT TOLERANCES

Course Description

Runout tolerances are applied to features of rotating parts. These tolerances reduce vibration and uneven wear of the features to which the tolerance is applied.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a tolerance zone for a circular runout tolerance
- Define a tolerance zone for a total runout tolerance
- Understand the difference between circular runout and total runout tolerances
- Understand the terms full indicator movement and total indicated reading

Estimated completion time (hours): 0.8

DWG-3010 LOCATION TOLERANCES

Course Description

Geometric tolerances control the position of axes, center planes, surfaces, and midpoints of features to datum features.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the three geometric tolerances for location
- Define the tolerance zone for concentricity
- Define the tolerance zone for symmetry
- Define the tolerance zone for the position of a feature at RFS
- Define the tolerance zone for the position of a feature at MMC

Estimated completion time (hours): 1.2

FASTENERS COURSES

FASTENERS

FAS-2001 TEMPORARY FASTENERS

Course Description

Temporary fasteners are used to hold materials together until permanent fasteners are installed. Temporary fasteners ensure that all of your drilled holes and fasteners will meet the engineering specifications.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify different types of temporary fasteners
- Determine how temporary fastener sizes are identified
- Understand why temporary fasteners are used
- Explain how to install Cleco clamps
- Explain how to install the different kinds of Cleco fasteners

Estimated completion time (hours): 0.8

FAS-2002 RIVETS

Course Description

Rivets are permanent mechanical fasteners used in airplane construction to hold two or more pieces of material together. Understanding how rivets work will enable you to install them properly.

Learning Objectives

By the end of this course, you will be able to do the following:

- Name two types of rivets used in aviation
- List the parts of a solid shank rivet
- Describe how solid shank rivets work
- Describe common solid shank rivet defects
- Describe how fluid-tight rivets are installed
- Explain how a rivet shaver is used

Estimated completion time (hours): 1.3

FAS-2003 BOLTS, SCREWS, AND WASHERS

Course Description

Bolts, screws, and washers are used to fasten two or more components together. Understanding how these fasteners work will enable you to install them properly.

Learning Objectives

By the end of this course, you will be able to do the following:

- Name the types of bolts used in aviation
- List the parts of a bolt
- Describe how these bolts work
- Explain how bolts are identified
- List the parts of a screw
- Describe different types of washers and their uses

Estimated completion time (hours): 0.9

FAS-2004 THREADED INSERTS

Course Description

A threaded insert is a device used to replace damaged internal threads or to provide greater holding strength for a thread in weak materials.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the two threaded insert designs
- List different locking mechanisms on threaded inserts

Understand the process of installing a threaded insert

Estimated completion time (hours): 2.0

FAS-2005 HI-LOKS

Course Description

Hi-Loks are permanent threaded fasteners that combine the best features of a rivet and a bolt.Their high strength-to-weight ratio makes Hi-Lok fasteners an excellent choice for many areas of the aircraft structure.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the benefits of a Hi-Lok fastener
- Identify and explain the major components of a Hi-Lok
- Explain the process of selecting the proper Hi-Lok
- Install a Hi-Lok fastener

Estimated completion time (hours): 0.9

FAS-2006 LOCKBOLTS

Course Description

Lockbolts are permanent threaded fasteners that combine the best features of a rivet and a bolt.Their high strength-to-weight ratio makes the lockbolt fastener an excellent choice for many areas of the aircraft structure.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the benefits of a lockbolt fastener
- Identify and explain the major components of a lockbolt
- Explain the process of selecting the proper lockbolt
- Install a lockbolt fastener

Estimated completion time (hours): 1.0

FAS-2007 NUT PLATES

Course Description

This course introduces you to nut plates, which are fasteners used to secure bolts on panels or other items that are frequently removed.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the different types of nut plates
- Understand the function of a nut plate
- List the tools needed to install a nut plate

Estimated completion time (hours): 0.7

FAS-2008 BLIND RIVETS

Course Description

Blind rivets are permanent mechanical fasteners that are installed from one side of the workpiece.They are used to hold two or more pieces of material together. Understanding how blind rivets work will enable you to install them properly.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the components of a blind rivet
- Describe how a blind rivet works
- List the components of a mechanical-lock blind fastener
- Describe how a mechanical-lock blind fastener works

Estimated completion time (hours): 0.7

FAS-2009 IDENTIFYING FASTENERS

Course Description

Aircraft fasteners come in many styles and sizes. Standard identification codes are used to identify the fasteners used in the aviation industry.

Learning Objectives

By the end of this course, you will be able to do the following:

- Recognize the identification standards used in fastener codes
- Recognize the codes that identify fasteners
- Understand the more common materials that fasteners are made of
- Identify the information in the National Aerospace Standard Code cross symbol

Estimated completion time (hours): 1.1

FAS-2010 FASTENERS AND FITS

Course Description

Fasteners and their mating parts are meant to join together in a particular way called a fit. How they fit together is very important to the structural stability of an aircraft.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the term fit in relation to fasteners and parts of an assembly
- List the different types of fits
- Understand the relationships between fasteners and their mating parts
- Understand how fastener fits are selected

Estimated completion time (hours): 1.0

FAS-2011 SECURING AND LOCKWIRING FASTENERS

Course Description

Torsion, tension, and the vibrations that occur during normal flight may cause some types of fasteners used in airplane assembly to loosen.These fasteners must be secured so that they remain in place.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand why bolts are secured
- Describe the ways bolts are secured
- Recognize a pair of lockwire pliers
- Recognize castellated nuts and cotter pins
- Understand how to use a cotter pin with a castellated nut

Estimated completion time (hours): 1.1

FAS-2012 TORQUE TOOLS

Course Description

Torque is the force that rotates an object around an axis. Torque tools, commonly called torque wrenches, apply this force to nuts and bolts used in airplane assembly.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define torque
- Identify the different types of torque tools
- Understand how torque is measured
- Convert between the different units used to measure torque

Estimated completion time (hours): 1.0

HAND TOOLS COURSES

HAN-2001 FILES, HAND REAMERS, AND LAPPING TOOLS

Course Description

Files, hand reamers, and lapping tools are used to shape materials. The shapes created with these tools include flat surfaces, curved surfaces, and precision holes. Each tool requires knowledge of the tool and its use to make products that meet the requirements of an engineering drawing.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the purpose and function of a file
- Identify the major components of a file
- List the most common types of files
- Define and describe the purpose of a hand reamer
- Discuss the use of an adjustable hand reamer
- Define and describe the purpose of a lapping tool
- Describe the purpose of lapping compounds

Estimated completion time (hours): 1.2

HAN-2002 HAMMERS, PUNCHES, AND CHISELS

Course Description

When creating tooling, a toolmaker must sometimes assemble component parts. When doing this, the toolmaker will often use hammers, punches, and chisels of various types.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the purpose and function of a hammer
- Identify the different types of hammers commonly used in tool making
- Describe the purpose and function of a mallet
- Identify the different types of mallets commonly used in tool making
- Describe the purpose and function of a punch
- List the types of punches commonly used in tool making
- Describe the purpose and function of a chisel
- Identify the different types of chisels commonly used in tool making

Estimated completion time (hours): 0.9

HAN-2003 PLIERS AND RATCHETS

Course Description

When creating fixtures, jigs, and other tooling, toolmakers use a variety of pliers and ratchets. These tools are used to secure, hold, or assemble work pieces either permanently or temporarily.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the use of pliers
- List the types of pliers commonly used by toolmakers
- Describe the use of a ratchet wrench
- State the method for switching between tightening and loosening on a ratchet wrench

Estimated completion time (hours): 0.8

HAN-2004 SCRIBES, OPTICAL CENTER FINDERS AND DRILL BLOCKS

Course Description

An important part of creating tooling is defining patterns and the locations of holes for cutting and drilling. Toolmakers use optical center finders and scribes in combination with templates when laying out tooling and drill blocks to ensure holes are drilled correctly.

Learning Objectives

By the end of this course, you will be able to do the following:

- State the purpose of layout dye
- Describe how layout dye is removed after machining
- Explain the use of scribing tools
- Describe the purpose of an optical center finder
- Describe the purpose of a drill block

Estimated completion time (hours): 0.8

HYDRAULICS COURSES

INTRODUCTION TO HYDRAULICS

HYD-1001 INTRODUCTION TO HYDRAULICS

Course Description

A hydraulic system uses liquid to transmit power. It is designed to create the energy required in the fluid to make the entire system operate.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand fluid power
- Define hydraulics
- Describe the differences between hydrostatic and hydrodynamic systems
- List the advantages of a fluid power system
- Identify the basic components of a fluid power system
- Compare a hydraulic and pneumatic system
- Compare four different types of power systems

Estimated completion time (hours): 1.1

HYD-1002 HYDRAULIC THEORY

Course Description

Hydraulics is based on physics. As a result, it’s crucial that you understand the theoretical concepts and fundamental laws applicable to hydraulics. Parameters to control include force, speed, acceleration, path, flow rate, and pressure. In addition, you need to understand the fundamental laws of hydraulics, such as the continuity equation, energy equation, and pressure losses due to friction.

Learning Objectives

By the end of this course, you will be able to do the following:

- Analyze and discuss the theoretical concepts applicable to hydraulics
- Summarize parameters and their units
- Understand the fundamental laws of hydraulics

Estimated completion time (hours): 1.3

HYD-1003 HYDRAULIC FLUIDS

Course Description

Hydraulic fluid plays an important role in a hydraulic system. Without hydraulic fluid, the service life of other components would be much shorter.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the functions of hydraulic fluids
- Understand the different types of hydraulic fluids
- Describe the different classifications of hydraulic oils and flame-retardant liquids
- Know how to select hydraulic oils based on characteristics and purpose
- Understand the importance of periodically checking hydraulic fluids

Estimated completion time (hours): 0.9

HYD-1004 HYDRAULIC SYSTEMS

Course Description

Hydraulic systems use fluid power to perform work. A simple hydraulic system consists of several common components, including a tank, pump, filter, heat exchanger, accumulator, valve, and actuator.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the purpose of a hydraulic system
- Identify the major components of a simple hydraulic system
- Describe the purpose of a hydraulic tank
- Identify the components of a hydraulic tank
- Describe the purpose of a hydraulic pump
- Understand how a hydraulic pump works
- Describe the purpose of a hydraulic filter
- Understand how a hydraulic filter works
- Describe the purpose of a heat exchanger
- Understand how a heat exchanger works
- Explain the purpose of a hydraulic accumulator
- Understand how a hydraulic accumulator works

Estimated completion time (hours): 1.4

COMPONENTS OF A HYDRAULICS SYSTEM

HYD-2001 HYDRAULIC ACTUATORS

Course Description

An actuator transforms hydraulic energy into mechanical energy so that work can be performed. An actuator may be in the form of a cylinder or motor.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the purpose of a hydraulic actuator
- Identify the different types of cylinders
- Describe the components of a cylinder actuator
- List the applications of hydraulic motors
- Recognize the importance of hydraulic motor maintenance

Estimated completion time (hours): 1.1

HYD-2002 CLASSIFICATION OF HYDRAULIC VALVES

Course Description

A hydraulic valve regulates and controls the hydraulic system’s fluid. Valves are classified based on the power to be transmitted, their function, the control, and their design. In this chapter, you’ll learn about the different classifications of hydraulic valves.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the purpose of a hydraulic valve
- Understand how a hydraulic valve works
- List the different classifications of hydraulic valves
- Describe the different types of pressure valves
- Understand the use of directional valves
- Describe classifications of shut-off valves
- Understand the different types of flow valves
- Describe on/off valves
- List the different types of proportional valves
- Describe the features of proportional control valves
- Describe the function of servo valves
- List the advantages and applications of cartridge valves
- Describe the main uses of logic valves

Estimated completion time (hours): 2.2

HYD-2003 HYDRAULIC PIPING AND INSTRUMENTATION

Course Description

Piping and tubing transport hydraulic energy throughout the circuit of a hydraulic system. This piping may be flexible or rigid. When flexible or rigid piping aren’t the best solution, connection blocks may be used. In addition, several types of instruments measure pressure and flow in hydraulic circuits.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the use of piping and tubing
- Describe the features of flexible and rigid piping
- Recognize the difference between fittings and one-touch fittings
- List the two connection types of rigid piping
- Understand the use of connection blocks
- List the types of pressure measuring instruments
- Describe how a pressure gauge works
- Understand the functions of a pressure switch and pressure transducer
- List the types of flow measuring instruments
- Identify what a multimeter can measure

Estimated completion time (hours): 1.0

HYD-2004 HYDROELECTRIC SYMBOLOGY AND CIRCUITS

Course Description

In this course, you’ll discover the symbols used in hydraulic systems. You’ll also learn about basic hydraulic and electrohydraulic circuits and their applications.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify basic symbols
- Identify the symbols of the elements for a hydraulic group
- Identify hydraulic pump symbols
- Identify hydraulic actuator symbols
- Identify hydraulic valve symbols
- Identify basic hydraulic and electrohydraulic circuits and their applications

Estimated completion time (hours): 1.5

LOGISTICS COURSES

INTRODUCTION TO LOGISTICS

LOG-1001 WHAT IS LOGISTICS?

Course Description

Have you ever thought about the journey your smart phone took from the manufacturer to your hands? After it was manufactured, it then it went through a detailed logistics process. Let me just say that logistics is way more than just transportation! It's a complex system that's essential to the manufacturing process.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define logistics
- Identify key accomplishments in the history of logistics
- Identify the main types of logistics
- Describe the fundamental tasks associated with logistics
- List the top logistics companies in Indiana

Estimated completion time (hours): 0.9

LOG-1002 LOGISTICS TECHNOLOGY

Course Description

Today, technology and logistics are deeply intertwined. Updated IT systems ensure the flow of products and data. Trade and product sales would sink without the right technology. In this course you will take a closer to look at a few important processes for supply chain management and material handling, as well as the technology needed for those processes.

Learning Objectives

By the end of this course, you will be able to do the following:

- Differentiate among the various technologies that enable and support supply chain management
- Identify the main categories associated with material handling
- Differentiate among the various technologies that enable and support material handling

Estimated completion time (hours): 0.8

LOG-1003 INVENTORY

Course Description

Inventory is the result of tons of planning and processes. Too much inventory is always bad for the company. In this course you will discover the real meaning of inventory.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe what inventory is and its importance
- Define lead time and its effect on inventory
- Determine the appropriate amount of inventory needed based on the situation
- Define Just-In-Time inventory
- Differentiate among the three types of inventory costs
- Describe how inventory management works
- Identify different types of inventory packaging

Estimated completion time (hours): 0.8

LOG-1004 DISTRIBUTION AND TRANSPORTATION

Course Description

When you think about logistics, you think about moving. This course focuses on some great strategies for getting finished products from one point to another, whether it's a retail store or the customer.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define product distribution and describe its importance
- Define warehousing and describe its role in supply chain management
- Identify steps involved in order processing
- Define material handling systems and describe how they function
- Identify different modes for transporting goods

Estimated completion time (hours): 0.9

LOG-1005 SAFETY, QUALITY AND THE ENVIRONMENT IN LOGISTICS

Course Description

There are three things you must be aware of in the world of logistics: safety, quality and the environment. Companies must develop programs and policies to make sure that no one gets hurt and that they are taking measures to avoid damaging the environment. They do this while working to make sure that their products are successfully handled and distributed.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the importance of safety and safety education in logistics
- Define quality as it relates to logistics
- Describe and define "green logistics"

Estimated completion time (hours): 0.7

LOG-1006 WINNING IN LOGISTICS

Course Description

Do you think you've got what it takes to be a winner in logistics? To make sure products are transported safely from the manufacturer's door to the customer's door? It takes many great minds to put together a winning logistics plan. A win in logistics means a win for the company and a win for customers who use the products.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the main elements that can help a logistics company "win"
- Understand how costs help determine a logistics company's success
- Recognize logistics teamwork strategies
- Explain how delivery, safety, environment and customers influence success

Estimated completion time (hours): 0.8

LOG-1007 CAREERS IN LOGISTICS

Course Description

The world of logistics is like its own ecosystem. Teams, roles and processes are tightly connected and dependent upon one another within companies and industries.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify teams that work together in the logistics world
- Articulate the overall mission of a team
- Describe various roles and responsibilities within logistics teams
- Describe how teams and individuals work together to prepare products for delivery

Estimated completion time (hours): 0.9

MANUFACTURING COURSES

INTRODUCTION TO MANUFACTURING

MFG-1001 WHAT IS ADVANCED MANUFACTURING?

Course Description

Many people think of “manufacturing” as mindlessly putting together widgets. But advanced manufacturing is at the heart of our modern culture. It offers so many opportunities for creative thinkers, problem-solvers, project leaders, people who enjoy working with the latest technologies and those who like to work with their hands.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define advance manufacturing
- Identify things you use in your life that are manufactured
- List the top manufacturing industries in the United States
- List the top manufacturing industries in Indiana

Estimated completion time (hours): 0.9

MFG-1002 MANUFACTURING HISTORY AND TECHNOLOGY

Course Description

Today's advanced manufacturing companies seek out and use cutting-edge technologies and machines. They embrace environmental practices. And there's a bigger focus on creating products for a global market. Imagine how you could make a difference with an exciting career in advanced manufacturing.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain events that influenced manufacturing throughout history
- List software technologies designed to help in the manufacturing process
- List manufacturing hardware that is used in modern advanced manufacturing
- Describe how connectivity on the macro and micro levels affects advanced manufacturing

Estimated completion time (hours): 1.0

MFG-1003 FROM IDEAS TO PRODUCTS

Course Description

Have you ever thought about how ideas become products? In this course you will learn about the process of taking great ideas and transforming them into amazing products that people want to use.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe how manufacturing helps transform ideas into products
- Identify different manufacturing roles and how they play a part in product development
- Identify ways technology can help in the product development process

Estimated completion time (hours): 0.9

MFG-1004 FROM DESIGN TO MANUFACTURING

Course Description

In this course, you will learn what it takes to design and get an advanced manufacturing facility up and running for a new product launch.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the process for planning an advanced manufacturing facility
- Identify different advanced manufacturing teams and their questions and concerns in creating a new facility
- Recognize the next steps after the plan has been finalized

Estimated completion time (hours): 1.1

MFG-1005 SAFETY, QUALITY AND THE ENVIRONMENT IN MANUFACTURING

Course Description

If you were involved in the world of advanced manufacturing, there are three things you're constantly thinking about: safety, quality and the environment. What do you think these words mean in terms of manufacturing? In advanced manufacturing, companies always think ahead when it comes to safety, quality and the environment.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the importance of safety and safety education in manufacturing
- Define “quality” as it relates to manufacturing
- Describe and define "green manufacturing”

Estimated completion time (hours): 0.7

MFG-1006 MEASURING SUCCESS IN MANUFACTURING

Course Description

Advanced manufacturing is unique in that you can experience the pride and satisfaction that comes with winning more often than you would working in a different field. What's cool about advanced manufacturing is that when you get a win, you're making a difference for the company, but you're also making a huge difference for yourself and for the world.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the main elements that can help a manufacturing company "win"
- Understand how costs—including target cost and cost of production—help determine an advanced manufacturing company's success
- Use math to determine the efficiency and productivity of a manufacturing cycle or equipment
- Explain how delivery, safety, environment and customers influence success

Estimated completion time (hours): 0.9

MFG-1007 CAREERS IN MANUFACTURING

Course Description

The world of advanced manufacturing is like its own ecosystem. Teams, roles and processes are tightly connected and dependent upon one another within companies and industries. This course looks at the different teams and roles in more detail.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify teams that work together in the advanced manufacturing world
- Articulate the overall mission of a team
- Describe various roles and responsibilities within advanced manufacturing teams
- Describe how teams and individuals work together to manufacture quality products

Estimated completion time (hours): 1.1

MANUFACTURING AND LOGISTICS GAME
MFG-1008 THE GAME OF MANUFACTURING AND LOGISTICS

Course Description

Have you ever thought about what it takes to not only design, but also produce, program, test and deliver an electronic device? And to make sure that product is a profitable success! This game-based course lets you design and deliver a new product while trying to maintain costs and deliver the product on time.

Learning Objectives

By the end of this course, you will be able to do the following:

- Design an electronic device
- Produce an electronic device
- Program an electronic device
- Test an electronic device
- Deliver an electronic device
- Take a product to market

Estimated completion time (hours): 0.6

ENGINEERING PROCESSES
MFG-1009 THE ENGINEERING PROCESS

Course Description

Creating a new product, whether it's something as small as a pen or something as large as an airplane, doesn't just happen. It takes a lot of hard work and creative thinking.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the phases in the engineering process
- Understand the function of each stage in the engineering process

Estimated completion time (hours): 0.8

MFG-1010 INFORMATION SHARING

Course Description

Computer document storage systems enable global access to critical documents and engineering information. Sharing information electronically ensures that everyone in the company has the latest and most accurate information when and where they need it.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe why it is important to share information
- Understand why electronic information sharing systems are used
- Describe the different types of information stored electronically
- Explain how document storage will impact you in your job

Estimated completion time (hours): 0.8

MANUFACTURING PAPERWORK
MFG-1011 AIRPLANE REGULATIONS

Course Description

The aerospace industry is a regulated industry. These regulations explain why airplane manufacturers need to keep documentation of how and when airplanes are made and the types of information they must contain.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the federal agency charged with regulating the aviation industry
- Understand the role of paperwork in regulating the aviation industry
- List the different levels of paperwork
- Recognize the types of paperwork you will see on the assembly floor
- Understand why completing paperwork is important

Estimated completion time (hours): 0.9

MFG-1012 THE PRODUCTION ORDER

Course Description

The production order is a document with instructions on how to produce detail parts and assemblies according to engineering.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the purpose of a production order
- Identify the people responsible for creating the production order
- Describe the information you can find in a production order
- Understand how to use the production order
- Understand why following all the steps in a production order is important

Estimated completion time (hours): 1.0

MFG-1013 THE INSTALLATION PLAN

Course Description

The installation plan is the authorization document that allows the assembly of an airplane. The installation plan contains everything you need to complete the assembly.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the purpose of an installation plan
- List the sections of an installation plan
- Describe the information you can find in each section of the installation plan
- Understand why following all the steps in an installation plan is important

Estimated completion time (hours): 0.9

MATERIALS COURSES

METALS AND MATERIALS MAT-2001 INTRODUCTION TO METALS

Course Description
Metal products are used in every industry, including construction, transportation, electronics, manufacturing, medical devices, and consumer products. It is important to understand the properties of metals when designing products and choosing manufacturing processes.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Identify metal products
 - Recognize a periodic table and the metals, nonmetals, and metalloids classifications
 - Define metals, nonmetals, and metalloids
 - Describe and compare the properties of metals, nonmetals, and metalloids
 - Explain that metal, nonmetal, and metalloid elements can be combined to form metal alloys
 - Explain why machinability is important
 - Describe the mechanical properties of metals, including strength, toughness, ductility, malleability, brittleness, and hardness
 - Identify and compare methods of testing hardness
 - Describe and compare how metal parts are formed and how mechanical properties affect metal forming

Estimated completion time (hours): 1.1

MAT-2002 FERROUS METALS
Course Description
Irons, steels, and their alloys make up the family of ferrous metals. Ferrous metals are the most widely used metals in the world.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define ferrous metals
 - Compare the composition, properties, and uses of cast, wrought, and pig iron
 - Compare the composition, properties, and uses of plain carbon, alloy, stainless, and tool steels
 - Identify some of the elements used in iron and steel alloys and the properties they enhance

Estimated completion time (hours): 0.9

MAT-2003 NONFERROUS METALS
Course Description
Nonferrous metals include metal elements that are not iron and alloys that do not have iron as their base metal. Some important and widely used nonferrous metal alloys have base elements of aluminum, titanium, copper, magnesium, and nickel.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define nonferrous metals
 - Compare the composition, properties, and uses of aluminum, titanium, copper, magnesium, and nickel alloys
 - Identify some of the additional alloying elements used in nonferrous metals and the properties they enhance
 - Identify common uses of nonferrous metals

Estimated completion time (hours):0.8

MAT-2004 HEAT TREATMENT OF METALS
Course Description
Heat treatment involves the controlled heating and cooling of a metal to obtain desirable changes in its mechanical properties. It can be used to increase the machinability and performance of metals.

- Learning Objectives**
By the end of this course, you will be able to do the following:
- Define heat treatment of metals
 - Define quenching
 - Describe and compare annealing, normalizing, and tempering
 - Compare different methods of hardening metals
 - Identify which heat treatment methods can be used on various steels and steel alloys

Estimated completion time (hours): 1.1

MEASUREMENT COURSES

PRECISION MEASUREMENT TOOLS

MEA-2001 INTRODUCTION TO PRECISION INSTRUMENTS

Course Description

Precision measurement instruments differ from normal measurement tools because of their ability to measure with a greater degree of precision and accuracy. To properly interpret these measurements, you must understand terms that are associated with these instruments.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the difference between precision and accuracy
- Identify the resolution of a precision instrument
- Determine the discrimination of a precision instrument
- Identify the basic components of a measurement

Estimated completion time (hours): 1.1

MEA-2002 RULES

Course Description

Rules are measurement tools used to measure distance and draw straight lines. Rules are used in many manufacturing, construction, and medical processes. In this course, you will gain the mastery required to accurately measure with a rule.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the key components of the precision rule
- Interpret a rule's graduation lines
- Identify rules based upon their measurement scale
- Choose which type of precision rule to use to measure a length
- Use the precision rule to accurately measure a length

Estimated completion time (hours): 1.1

MEA-2003 CALIPERS

Course Description

Calipers are measurement tools that are designed to measure distance, length, and depth. They are used in many professions, including manufacturing, woodworking, and health care. In this course, you will gain the mastery required to accurately measure with calipers.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify all of the parts of a caliper
- Describe how the parts work together to measure
- Interpret the graduation scales on the caliper
- Zero set your caliper
- Use the caliper to measure a length and depth
- Properly care for your caliper

Estimated completion time (hours): 1.3

MEA-2004 MICROMETERS

Course Description

The micrometer is a precision measurement tool used to measure small lengths and distances. Micrometers are one of the most common measurement tools used in almost every manufacturing industry in the world. In this course, you will gain the mastery required to accurately measure products with a micrometer.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the parts of a micrometer
- Describe how the parts work together to measure a product
- Interpret the graduation scales on the standard and Vernier micrometer
- Use the micrometer to accurately measure a distance
- Properly care for your micrometer

Estimated completion time (hours): 1.9

MEA-2005 SMALL HOLE GAUGES

Course Description

A small hole gauge is a precision measurement tool that is ideal for measuring small holes, slots, and recesses in all kinds of work. The small hole gauge is used in aviation to inspect close tolerance holes, such as rivet holes and holes for Hi-Lok fasteners. In this course, you will gain the mastery required to accurately measure with a small hole gauge.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify all of the parts of a small hole gauge
- Describe how the parts work together to measure
- Use the small hole gauge to accurately measure a diameter and width
- Properly care for your small hole gauge

Estimated completion time (hours): 0.8

MEA-2006 DIAL INDICATORS

Course Description

Dial indicators are precision measurement tools that are used to measure small variations in a measurement distance. Dial indicators measure distances that are impossible to see with the naked eye. In this course, you will gain the mastery required to accurately measure with a dial indicator.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the purpose of a dial indicator
- Differentiate between a balanced and a long-range of dial indicator
- List the major components of a dial indicator
- Explain how to perform a measurement with a dial indicator

Estimated completion time (hours): 1.2

MEA-2007 BORE GAUGES

Course Description

Bore gauges are self-indicating, self-centering comparative gauges for detecting size deviations and shape defects of holes. Bore gauges ensure that the holes you inspect meet the requirements of the engineering specifications. In this course, you will gain the mastery required to accurately measure with a bore gauge.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the most common types of bore gauges
- Define the characteristics of a precision hole
- Identify and explain the major components of bore gauges
- Demonstrate how to use different types of bore gauges to inspect hole size and hole shape

Estimated completion time (hours): 1.6

MEA-2008 HEIGHT GAUGES

Course Description

A height gauge is a measurement instrument used to measure vertical distances. Height gauges are very versatile and can be used to measure many different product characteristics. In this course, you will gain the mastery required to accurately measure with a height gauge.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Explain the purpose and function of a height gauge
 - Identify the major components of a height gauge
 - Define the measurement points of a height gauge measurement
 - Use a height gauge to measure a vertical distance

Estimated completion time (hours): 1.1

MEA-2009 GO/NOGO GAUGES

Course Description

Go/NoGo gauges are used to inspect product features when a variable measurement is not necessary. Go/NoGo gauges make inspection of these features faster and more efficient. In this course, you will gain the mastery required to accurately measure with a Go/NoGo gauge.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Identify the different types of Go/NoGo gauges used to inspect holes
 - Use a Go/NoGo gauge to inspect hole features

Estimated completion time (hours): 0.9

MEA-2010 TEST INDICATORS

Course Description

Test indicators are measurement tools that are used for comparative measurements. Test indicators are commonly used to determine form, shape, and positional deviations. In this course, you will gain the mastery required to accurately measure with a test indicator.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Explain the purpose of a test indicator
 - Identify and define the major components of a test indicator
 - Attach a test indicator to an external device
 - Properly align the contact point of a test indicator
 - Use a test indicator to perform a comparative measurement

Estimated completion time (hours): 1.1

MEA-2011 GO/NOGO THREAD GAUGES

Course Description

Go/NoGo thread gauges are used to inspect the form of a threaded hole. Threads are one of the most common mechanical forms used to join parts. Understanding the terms associated with threads is important for anyone working with threaded holes and fasteners. In this course, you will gain the mastery required to accurately measure with a Go/NoGo thread gauge.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Identify the different types of threads
 - List the components of a thread
 - Use Go/NoGo thread gauges to inspect thread form
 - List different types of Go/NoGo thread gauges
 - Properly care for Go/NoGo thread gauges

Estimated completion time (hours): 1.4

MEA-2012 ATTRIBUTE GAUGES

Course Description

Attribute gauges are designed to quickly inspect the size or function of a product characteristic. The term attribute gauge can be applied to many different types of inspection devices. In this course, you will gain the mastery required to accurately measure with attribute gauges.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Define the purpose of attribute gauges
 - Explain the function and features of attribute gauges
 - List the most common types of attribute gauges
 - Identify the major components of attribute gauges
 - Use an attribute gauge to inspect a product

Estimated completion time (hours): 1.0

MEA-2013 THICKNESS AND RADIUS GAUGES

Course Description

Thickness and radius gauges are comparative measurement tools that are used when measuring gaps or rounded corners of workpieces. In this course, you will gain the mastery required to accurately measure with a thickness and radius gauges.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Explain the purpose and function of a thickness gauge
 - Identify the major components of a thickness gauge
 - Use a thickness gauge to make a comparative measurement
 - Explain the purpose and function of a radius gauge
 - Identify the major components of a radius gauge
 - Use a radius gauge to measure the radius on a workpiece

Estimated completion time (hours): 1.0

MEA-2014 SQUARES AND PROTRACTORS

Course Description

Marking and inspecting perpendicular and angular surfaces is critical to produce quality products. Precision instruments called squares and protractors are used extensively to ensure squareness and accurate angles. In this course, you will gain the mastery required to accurately measure with squares and protractors.

Learning Objectives

- By the end of this course, you will be able to do the following:
- List the parts of a solid square
 - List the parts of a combination square
 - Use a solid square to mark perpendicular lines
 - Use a center head to find the center of a round part
 - Use a combination square to measure and mark lines
 - Use a protractor head to mark angular lines

Estimated completion time (hours): 1.3

MEA-2015 SURFACE ROUGHNESS COMPARATORS

Course Description

Surface roughness comparators are used to establish a basis for the feel of the roughness of surfaces on manufactured parts to a known roughness value. In this course, you will gain the mastery required to accurately measure with a surface roughness comparators.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the characteristics of surface texture
- Identify a surface texture symbol on an engineering drawing
- Identify the components of the surface texture symbol
- Compare the roughness of a surface of a part to a surface roughness comparator

Estimated completion time (hours): 1.0

MEA-2016 ADJUSTABLE PARALLELS

Course Description

An adjustable parallel is one of the most simple, yet versatile, precision instruments used in manufacturing. Understanding how to use an adjustable parallel is important for many individuals in manufacturing. In this course, you will gain the mastery required to accurately measure with adjustable parallels.

Learning Objectives

By the end of this course, you will be able to do the following:

- List uses of an adjustable parallel
- List the parts of an adjustable parallel
- Use an adjustable parallel and dial caliper to measure the width of a slot

Estimated completion time (hours): 0.7

MEA-2017 SURFACE PLATES

Course Description

Surface plates are a vital precision measurement tool. In this course, you will discover how to use and care for this precision instrument so that you can achieve accurate and precise measurements. In this course, you will gain the mastery required to accurately measure using a surface plate.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe a surface plate
- Identify other precision instruments that require a surface plate to measure products
- List product characteristics commonly measured with a surface plate and other precision instruments
- Identify common materials of surface plates
- List the three grades of surface plates
- Understand the quality differences between each grade
- Use best care practices

Estimated completion time (hours): 0.9

MEA-2018 OPTICAL COMPARATORS

Course Description

Using an optical comparator, you can measure parts that may be difficult to measure with other devices. In this course, you’ll discover the parts of an optical comparator and how they work together to create an enlarged image. You’ll also learn about field of view, common methods of measurement, and proper care of an optical comparator.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe an optical comparator
- Identify the parts of an optical comparator
- Explain how an optical comparator works
- Understand the field of view
- Know common methods of measuring with an optical comparator
- Properly care for an optical comparator

Estimated completion time (hours): 0.9

MEA-2019 OPTICAL CENTER FINDERS

Course Description

Optical center finders are used to align a drill bushing with scribed hole location lines on a part. They are very useful when the tolerances for hole location are critical. In this course, you will gain the mastery required to accurately measure with an optical center finder.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define and explain the optical center finder
- Identify the components of a drill guide
- Use an optical center finder to align a drill bushing with scribed hole location lines

Estimated completion time (hours): 0.8

FASTENER INSPECTION GAUGES

MEA-2020 GRIP GAUGES

Course Description

The grip gauge is a precision measurement tool that is used measure material thickness to determine the proper fastener length when fastening two pieces of material together. Grip gauges are used in many different industries. In this course, you will gain the mastery required to accurately calculate grip length with the grip gauge.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify all of the parts of a grip gauge
- Describe how the parts work together to determine fastener length
- Use the grip gauge to accurately calculate fastener length
- Properly care for your grip gauge

Estimated completion time (hours): 0.8

MEA-2021 COUNTERSINK GAUGES

Course Description

The countersink gauge is a precision measurement tool that is used to measure the diameter of the top of a countersink. Countersink gauges are prevalent in the machining and aerospace industries. In this course, you will gain the mastery required to accurately measure with the countersink gauge.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify all of the parts of a countersink gauge
- Describe how the parts work together to measure a product
- Accurately use the countersink gauge to measure a diameter
- Properly care for your countersink gauge

Estimated completion time (hours): 1.3

MEA-2022 FASTENER HEIGHT GAUGES

Course Description

The fastener height gauge is a precision measurement tool that is used to measure the distance from a countersunk fastener head to the surface of the material it is fastening. Fastener height gauges are widely used in the aerospace and fabrication industries. In this course, you will gain the mastery required to accurately measure products with the fastener height gauge.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify all of the parts of a fastener height gauge
- Describe how the parts work together to determine fastener height
- Use the fastener height gauge to accurately measure fastener height
- Properly care for your fastener height gauge

Estimated completion time (hours): 0.8

MEA-2023 RIVET INSPECTION GAUGES

Course Description

Installed rivets must be inspected to make sure the installation meets the engineering requirements. In this course, you will gain the mastery required to accurately measure with rivet inspection gauges.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define all of the inspection requirements for a rivet installation
- Identify and explain all of the precision instruments used to inspect rivet installations
- Perform all of the inspection processes

Estimated completion time (hours): 0.9

MEA-2024 FASTENER INSPECTION GAUGES

Course Description

Selecting and installing Hi-Lok and lockbolt fasteners is a complex process that requires the use of precision measurement instruments. Some of these precision instruments help you identify the correct fastener to use, while others ensure the installed fastener meets the engineering requirements. In this course, you will gain the mastery required to accurately measure fasteners with fastener gauges.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify all of the parts of a Hi-Lok fastener
- Identify all of the parts of a lockbolt
- Identify all of the fastener gauges
- Use the pin protrusion gauge to accurately measure a fastener installation
- Properly care for your fastener gauges

Estimated completion time (hours): 1.3

MEA-2025 GAP INSPECTION GAUGES

Course Description

Gap is defined as a space between two assembled components. Gap inspection gauges are used to measure these spaces. In this course, you will gain the mastery required to accurately measure gap with a variety of gauges.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify all of the parts of a Gapman gauge
- Describe how the parts work together to measure a product
- Interpret the measurement readings of the Gapman gauge
- Use the Gapman gauge to accurately measure a distance
- Properly care for your Gapman gauge

Estimated completion time (hours): 1.7

WELD GAUGES

MEA-2026 WELD GAUGES

Course Description

Measuring instruments designed to measure various weld dimensions and discontinuities are referred to as weld gauges. Understanding the function and use of these instruments is important for a technician who inspects welds. In this course, you will gain the mastery required to accurately measure with weld gauges.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the uses of weld fillet gauges
- List the parts of an automatic weld size gauge
- Understand the uses of an automatic weld size gauge
- List the parts of a Hi-Lo gauge
- Understand the uses of a Hi-Lo gauge
- List the parts of a bridge cam gauge
- Understand the uses of a bridge cam gauge

Estimated completion time (hours): 2.2

NON-DESTRUCTIVE EXAMINATION (NDE) COURSES

INTRODUCTION TO NON-DESTRUCTIVE EXAMINATION COMMERCIAL NDE-3037 WHAT IS NON-DESTRUCTIVE EXAMINATION?

Course Description

The field of nondestructive examination touches many of the products that you use every day. In this course, you will begin to learn about this broad field and where it is used.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define nondestructive examination
- Describe the benefits of nondestructive examination
- List industries that use nondestructive examination
- List organizations that regulate the safety and reliability of products and services
- Describe career opportunities in the field of nondestructive examination

Estimated completion time (hours): 1.0

NDE-3038 THE NDE PROCESS

Course Description

A wide variety of methods are used to perform nondestructive examination (NDE). These methods use the same general process and common terminology. Understanding these key concepts is the first step in understanding the field of NDE.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define terminology used in the field of NDE
- Describe where NDE is used
- Describe different methods of NDE
- Describe the NDE process

Estimated completion time (hours): 1.2

NDE-3039 MATERIALS

Course Description

In this course, you'll discover why it's important that NDE technicians have some knowledge of material science. In particular, you'll learn about the properties of metals, ceramics, polymers, and composites.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define terms used to describe materials
- List the properties of metals
- List the properties of ceramics
- List the properties of polymers
- List the properties of composites

Estimated completion time (hours): 0.8

NDE-3040 METALS MANUFACTURING AND PROCESSES

Course Description

Understanding metals manufacturing and processes is vital to your success as an NDE technician. Although discontinuities can occur at any time during the manufacturing of a product, certain types of discontinuities are more common during specific manufacturing stages.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define terms used in metals manufacturing and process
- Describe casting and wrought processes
- Identify various types of inherent and processing discontinuities
- Describe assembly, surface treatment, and strengthening processes

Estimated completion time (hours): 1.1

INTRODUCTION TO NON-DESTRUCTIVE EXAMINATION NDE-3041 TESTING OF MATERIAL PROPERTIES

Course Description

The fields of nondestructive and destructive testing are related. An NDE technician must have a thorough understanding of material properties, most of which are commonly established by destructive testing.

Learning Objectives

By the end of this course, you will be able to do the following:

- List three groups of material properties
- Describe testing methods used to establish material properties
- List key points on the engineer's stress-strain diagram
- List the stages of fatigue
- List the stages of creep
- Describe several methods of hardness testing

Estimated completion time (hours): 3.4

NDE-3042 LOADS, STRESSES, AND DISCONTINUITIES

Course Description

In this course, you'll learn about the five different types of service loads, as well as common discontinuities. You'll also understand different types of in-service discontinuities.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the difference between inherent, processing, and service-induced discontinuities
- Define static and dynamic loading
- Describe the five fundamental types of loading
- Define stress and strain
- Understand two categories of deformation
- Define creep
- Know the difference between constant and varying loads
- Understand the different types of in-service discontinuities
- Understand the difference between a defect and a discontinuity

Estimated completion time (hours): 1.3

NDE-3043 FRACTURE MECHANICS

Course Description

Fracture mechanics is an engineering discipline where the presence of a crack is assumed. It makes quantitative relations among the crack depth, its length, the material’s inherent resistance to crack growth, and the determination of the ultimate stress intensity at which the crack propagates to cause structural failure. Fracture mechanics relies on the results of nondestructive examination to help predict when flawed parts might fail.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define fracture mechanics
- Define dormant and dynamic flaws
- List three modes of fracture
- Define terms used in fracture mechanics
- Understand flaw characterization
- Understand the role NDE plays in fracture mechanics analysis

Estimated completion time (hours): 0.9

NDE-3044 NDE METHODS

Course Description

This course provides a general overview of the six major categories of NDE methods, including their advantages and limitations. Learning about the general capabilities of the various NDE technologies will assist you in choosing the appropriate NDE method or methods when testing for product integrity or assessing the condition of a product.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe each NDE method
- Identify where each method is used
- List the advantages of each method
- List the limitations of each method

Estimated completion time (hours): 1.9

NDE-3045 PERSONNEL QUALIFICATION

Course Description

Before performing NDE, a technician must be qualified and certified. In this course, you will learn about global processes for personnel qualification and certification and specific requirements used in the United States.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the process for personnel qualification
- Compare employer-based certification to central certification
- Define terminology, including qualification, certification, and recommended practice
- Define three levels of personnel qualification
- Understand that the initial training and experience requirements are greater for more complex NDE methods
- Describe what is typically included in an organization’s NDE Personnel Qualification and Certification written practice

Estimated completion time (hours): 0.8

VISUAL TESTING COMMERCIAL

NDE-3046 INTRODUCTION TO VISUAL TESTING

Course Description

Visual testing is the most common method of nondestructive testing. In fact, most nondestructive applications rely on a visual assessment of parts or components prior to applying their specific test inspection method. Without visual testing, discontinuities, such as cracks in aircraft parts, may be missed, potentially leading to life-ending tragedies.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define nondestructive visual testing
- Understand the history of visual testing
- List applications of visual testing
- Define common terms associated with visual testing

Estimated completion time (hours): 1.1

NDE-3047 LIGHT

Course Description

Light and vision are key factors in the success of visual testing. Detecting discontinuities depends on how well a technician can see them, which is influenced by the quantity and direction of light.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the physics of light
- Understand the difference between artificial and natural light sources
- Recognize the effect of different amounts of light and light direction on visual testing
- Define key terms related to light and vision
- Know how to measure illumination
- Understand reflected and refracted light
- Learn about different types of lenses
- Describe how the human eye processes light

Estimated completion time (hours): 2.6

NDE-3048 STANDARD INSPECTION TECHNIQUES

Course Description

An NDE technician may conduct visual testing directly or indirectly. While direct visual testing gives the technician an uninterrupted line of sight to the test object, indirect visual testing requires the use of visual aids to achieve a line of sight to the test object.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the basic techniques used in visual testing
- Understand the differences between direct and indirect visual testing
- Understand the difference between local direct visual testing and general visual testing

Estimated completion time (hours): 1.5

NDE-3049 VISUAL TESTING EQUIPMENT

Course Description

An NDE technician may use several different types of equipment and optical aids to perform visual testing. In this course, you'll discover how a borescope, fiberscope, and videoscope work. You'll also learn the roles cameras and resolution charts play in visual testing.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Identify the parts of a borescope
 - Understand the differences between a borescope, fiberscope, and videoscope
 - Understand the role a camera plays in indirect visual testing
 - Identify the parts of an indirect visual test system

Estimated completion time (hours): 0.6

NDE-3050 HIERARCHY OF PRODUCT STANDARDS

Course Description

In this course, you'll find out about the hierarchy of standards, which dictates the general requirements a test product must meet. You'll also learn about other standards that may be required and what to do when the standards conflict.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Understand the hierarchy of standards
 - List the requirements of the design standard
 - Know what to do in case of a conflict between standards
 - List what procedure documents need to include

Estimated completion time (hours): 0.9

NDE-3051 VISUAL TESTING OF CASTINGS

Course Description

Standards play an important role in visual testing. Depending on the standard required, the NDE technician can compare the test object to photographs, actual replicas of surface irregularities, and written criteria.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Understand how photographs and replicas of surface irregularities are used in visual testing
 - Know the differences between comparators for the same type of surface irregularity

Estimated completion time (hours): 1.0

NDE-3052 VISUAL TESTING OF ROLLED PRODUCTS

Course Description

In this course, you'll learn the difference between an imperfection and a defect. You'll also discover discontinuities common in rolling and drawing.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Understand the difference between an imperfection and a defect
 - Recognize typical discontinuities of rolled products
 - Know how to measure a discontinuity's depth
 - Identify common discontinuity arrangements
 - Understand the process for repairing affected areas

Estimated completion time (hours): 0.9

NDE-3053 VISUAL TESTING OF WELDS

Course Description

In this course, you'll find out about the process of visually testing welds. You'll also discover the importance of meeting acceptance standards, as well as the information required on a typical visual test report.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Understand NDE examination symbols used on engineering drawings or instructions
 - Describe the process of visually testing a weld
 - Understand when visual testing of a weld may occur
 - Understand what to look for during each stage of the welding process
 - Know what basic information is needed for a visual test report

Estimated completion time (hours): 1.4

NDE-3054 VISUAL TESTING IN INDUSTRIAL COMPONENTS

Course Description

In this course, you'll become acquainted with common industrial components, such as storage tanks, pressure vessels, piping, valves, pumps, hangers, and supports.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Understand the working principles of common industrial components
 - Describe different types of valves
 - Describe three different functions of valves
 - Describe different types of pumps
 - Describe different types of hangers and supports
 - Describe the operation of common industrial components
 - Identify discontinuities common in industrial components

Estimated completion time (hours): 1.4

PROGRAMMABLE LOGIC CONTROLLERS (PLC) COURSES

PROGRAMMABLE LOGIC CONTROLLERS

PLC-1001 INTRODUCTION TO PROGRAMMABLE CONTROLLERS

Course Description

Programmable controllers are industrial, programmable circuits used to control production processes. They are a low-cost and powerful alternative for directing and managing automated systems in all types of industries.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the historical evolution of programmable controllers
- Understand the role and importance of programmable controllers in automated processes
- Become familiar with the most typical applications of programmable controllers

Estimated completion time (hours): 1.0

PLC-1002 INTRODUCTION TO DIGITAL ELECTRONICS

Course Description

Digital electronics is the foundation of programmable logic controllers. Digital devices like PLCs use circuits programmed with a logic system to determine the output based on one or more inputs. Understanding how digital circuits work will help you better understand how a PLC operates.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define digital electronics
- Identify the number systems used by PLCs
- Identify the data types used by PLCs
- Identify and define the logic gates used in PLC programming
- Understand how logic gates function
- Identify the symbols for logic gates

Estimated completion time (hours): 1.5

PLC-2001 TYPES AND FUNCTIONS OF PROGRAMMABLE CONTROLLERS

Course Description

Programmable controllers are frequently used in automatic control systems to control machines and processes. There are many different types and functions of programmable controllers in use today. Their applications are diverse, ranging from commercial to residential to industrial.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the different types of programmable controllers
- Identify the functions of the different types of programmable controllers
- Provide examples of typical applications for the different types of programmable controllers

Estimated completion time (hours): 0.8

PLC-2002 GENERAL STRUCTURE OF PLC

Course Description

A PLC is built using the same basic components that are found in the personal computer at your home, school, or business. Because a PLC is used for industrial operations, specialized components are available that allow it to communicate with and control automated equipment.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the main components of a generic PLC
- Identify the sub-components of each main component
- Identify the various configurations of the main components

Estimated completion time (hours): 1.4

PLC-2003 PHYSICAL INTEGRATION OF THE PLC

Course Description

PLCs are designed to be integrated with machines and devices to monitor and control automated processes. The integration is achieved through a series of electrical connections that allow the PLC to receive, process, and send electrical signals.

Learning Objectives

By the end of this course, you will be able to do the following:

- Become familiar with the different ways of providing electrical power to a PLC
- Identify the different methods of connecting sensors and devices to input courses
- Identify the different methods of connecting devices to output courses

Estimated completion time (hours): 1.3

PLC-2004 INTERNAL STRUCTURE OF THE CPU

Course Description

The CPU contains the elements that form the intelligence of the PLC. Understanding the components of the CPU and how they interact will help you gain the base knowledge needed to understand a PLC user program.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the different sections of the CPU and their interactions
- Describe how the information and data are processed and stored inside the CPU
- List different areas of memory
- Identify the elements of a logical address

Estimated completion time (hours): 1.2

PLC-2005 BASIC CONCEPTS OF PLC PROGRAMMING

Course Description

In order for a PLC to control an automated machine or process, it must be given a set of instructions. These instructions, or user programs, tell the PLC what inputs to monitor, how to process the data, and how to respond to the inputs.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the four steps a PLC performs during operation
- Define the term input scan
- Define the term program scan
- Define the term output scan
- Identify the symbols representing normally open and normally closed contact relays
- Identify the two structures used for programming

Estimated completion time (hours): 1.6

PLC-2006 COMMON PLC APPLICATIONS

Course Description

In this course, you will see examples of real world PLC operations and examples of ladder logic and GRAFCET programs used to control the PLC.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand solutions for different real world applications using PLCs

Estimated completion time (hours): 1.7

POWER TOOLS COURSES

HAND POWERTOOLS

POW-2001 PISTOL GRIP DRILLS

Course Description

Drill motors convert pneumatic or electrical power into rotational motion, which is used to rotate drill bits or other accessories mounted in the drill motor. These hand tools are used in many different areas of manufacturing.

Learning Objectives

By the end of this course, you will be able to do the following:

- List common types of drill motors
- Describe the components of a drill motor

Estimated completion time (hours): 0.8

POW-2002 DRILLING TECHNIQUES

Course Description

A quality hole results in less rework and lower overall manufacturing costs. In this course, you will learn about good drilling techniques which will help ensure you know how to drill a quality hole.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the characteristics of a quality hole
- Describe how different speeds and amounts of pressure affect the quality of a hole
- Describe how heat affects the quality of a hole
- Describe deburring tools
- Describe common hole defects

Estimated completion time (hours): 1.1

POW-2003 WINSLOW DRILLS

Course Description

This course introduces you to a specialized drill motor called the Winslow drill. The Winslow drill enables you to drill multiple holes at the same time, ensuring that they are the oriented correctly in relation to the hole for a special fastener.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe the parts of a Winslow drill
- Explain how to adjust the countersink depths
- Describe the operation of a Winslow drill

Estimated completion time (hours): 0.7

POW-2004 COMPRESSION RIVETERS

Course Description

Pneumatic compression riveters, sometimes called squeeze riveters or rivet squeezes, allow a single person to install rivets faster and more consistently than when using a pneumatic rivet gun.

Learning Objectives

By the end of this course, you will be able to do the following:

- Describe two types of compression riveters
- List the components of a compression riveter
- List the components of compression riveter dies
- Explain setting up a compression riveter
- Describe installing a rivet with a compression riveter

Estimated completion time (hours): 0.9

POW-2005 RIVET INSTALLATION TOOLS

Course Description

Rivet guns and blind rivet pullers are used to install rivets by driving or pulling them. These tools make it possible to join workpieces into an assembly.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the components of a rivet gun
- Explain the purpose of a bucking bar
- Describe how a rivet is installed using a rivet gun
- List the components of a blind rivet puller
- Describe how a rivet is installed using a blind rivet puller

Estimated completion time (hours): 1.1

STATIONARY POWER TOOLS

POW-2006 INTRODUCTION TO STATIONARY POWER TOOLS

Course Description

Power island equipment is stationary, floor-mounted power tools used in the manufacture of products. In this course, you will learn about the power island, some of the equipment found in the power island, and the necessary safety precautions when using power island equipment.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define power island
- Identify the common equipment in the power island
- Explain general safety precautions to use with power island equipment

Estimated completion time (hours): 1.0

POW-2007 DISC AND BELT SANDERS

Course Description

Disc and belt sanders are two of the machines you will find in the power island area. They are power tools used for removing material, rounding corners, breaking edges, deburring, and chamfering.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define disc sander
- Define belt sander
- Identify the common components of the disc sander and belt sander
- Explain general safety precautions used with the disc and belt sanders
- Understand how to properly use the sanders

Estimated completion time (hours): 1.3

POW-2008 DRILL PRESS

Course Description

The drill press is a common tool in a power island area that is used to create holes in metal, wood, plastic, and other materials.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the purpose of a drill press
- Identify the major components of the drill press
- Explain general safety precautions used with the drill press
- Understand how to properly use the drill press

Estimated completion time (hours): 1.2

POW-2009 BAND SAW

Course Description

The band saw is a power tool used for trimming straight and contouring wood, fiber, plastic, and sheet metal. In this course you will learn about the band saw, its major components, its proper use, and the necessary safety precautions when using this tool.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define band saw
- Identify the common components of the band saw
- Explain general safety precautions used with the band saw
- Understand how to properly use the band saw

Estimated completion time (hours): 1.2

POW-2010 ARBOR PRESS

Course Description

An arbor press is a tool that that is used to press together or take apart components of an assembly. It is a common tool in the power island area of the manufacturing plant.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the purpose of an arbor press
- Identify and explain the major components of an arbor press
- Describe how arbor presses are rated
- Use an arbor press to press-fit a dowel pin
- Use an arbor press to press-fit a liner bushing

Estimated completion time (hours): 1.1

POW-2011 BENCH GRINDER

Course Description

Bench grinders are stationary power tools that are used to quickly remove material from a workpiece. They are also used for sharpening and polishing operations.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define and explain the major components of a bench grinder
- Explain the hazards of the bench grinder
- Install a new wheel on the bench grinder
- Grind a simple part on the bench grinder

Estimated completion time (hours): 1.2

POW-2012 TABLE SAW

Course Description

The table saw is a power tool used for cutting wood, plastic, composite, and other materials to precise sizes and angles. In this course, you will learn about the table saw, its major components, its proper use, and the necessary safety precautions when using this tool.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define table saw
- Identify the common components of the table saw
- Explain general safety precautions used with the table saw
- Understand how to make adjustments to features of the table saw
- Distinguish between rip, crosscut, bevel, and miter cuts

Estimated completion time (hours): 1.6

POW-2013 OPERATING A TABLE SAW

Course Description

Understanding how to operate a table saw is useful in many industries. It is important for anyone operating a table saw to know how to make rip, crosscut, bevel, and miter cuts.

Learning Objectives

By the end of this course, you will be able to do the following:

- Make a rip cut
- Make a cross cut
- Make a bevel cut
- Make a miter cut

Estimated completion time (hours): 1.9

PNEUMATIC COURSES

INTRODUCTION TO PNEUMATICS

PNE-1001 INTRODUCTION TO PNEUMATICS

Course Description

Pneumatics is a technology that uses compressed air to make things move. Pneumatics has been used for thousands of years and has many industrial and commercial applications.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define pneumatics
- Define compressed air
- List the advantages of compressed air
- Explain the importance of pneumatics in automation
- List industrial and commercial applications where pneumatics are used
- Explain the historical evolution of compressed air technology

Estimated completion time (hours): 1.3

PNE-1002 PNEUMATIC SYSTEMS

Course Description

Pneumatic systems are designed to efficiently produce, prepare, deliver, and use compressed air. As air travels through the system, it is compressed, cleaned, cooled, and treated before it is delivered to a mechanical device.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the pneumatic production system
- Define the pneumatic consumption system
- List the components of the production system
- List the components of the consumption system
- Explain the qualities of compressed air

Estimated completion time (hours): 1.3

PNE-1003 THE PROPERTIES OF GASES

Course Description

In a pneumatic system, compressed air is used to create work. Because compressed air is a gas, it is important to understand how gases behave with changes in pressure, temperature, and volume. There are a few fundamental laws of gases that will help you understand these relationships.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the three primary states of matter
- Explain how temperature affects the states of matter
- Explain the relationships between the pressure temperature and volume of a gas
- Define pressure
- Define flow
- Describe humidity and how it is measured
- Explain how all of these work together in a pneumatic system

Estimated completion time (hours): 1.8

PNE-1004 AIR COMPRESSION AND DISTRIBUTION - PART ONE

Course Description

Delivering compressed air into industrial pneumatic devices requires a complex system with many important components. Each of these components plays an essential part in the production of the proper amount of quality compressed air.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define the purpose of an air compressor
- Identify the different methods for air compression
- Explain how a positive displacement compressor compresses air
- Explain how a dynamic compressor compresses air
- Define the purpose of the air receiver
- Identify the elements of an air receiver

Estimated completion time (hours): 1.9

PNE-1005 AIR COMPRESSION AND DISTRIBUTION - PART TWO

Course Description

Compressing air produces heat, oil, and concentrated water. Before compressed air is distributed, it must be cooled, dried, and filtered. Once the compressed air is properly prepared, it is then distributed through an engineered network of pipes and fittings.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the need for air dehydration
- List the devices used to remove water from the compressed air
- Define the need for air filtration
- List the types of air distribution systems
- List the materials used to construct a distribution system
- Explain the advantages of each system
- Explain how to size an air distribution system
- Define the primary types of air fittings

Estimated completion time (hours): 1.5

COMPONENTS OF A PNEUMATIC SYSTEM

PNE-2001 COMPRESSED AIR TREATMENT

Course Description

Compressed air treatment is a process that includes filtering, lubricating, and regulating the pressure of the air. This process requires the use of several specialized devices.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the need for compressed air treatment
- List the types of air treatments
- Explain the need for air filtration
- List the types of air filters
- Explain the need for air pressure regulation
- List the types of pressure regulators
- Explain the need for air lubrication
- List the types of air lubricators

Estimated completion time (hours): 1.4

PNE-2002 PNEUMATIC ACTUATORS

Course Description

Pneumatic actuators use compressed air to create mechanical motion. They perform most of the work in an industrial automated system. There are thousands of configurations of actuators to perform any task you could imagine.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a pneumatic actuator
- List the primary types of pneumatic actuators
- Explain how a linear cylinder actuator works
- Explain how a rotary actuator works
- Describe the purpose of an air gripper

Estimated completion time (hours): 2.4

PNE-2003 DIRECTIONAL CONTROL VALVES

Course Description

Directional control valves are used to manage the flow of compressed air to and from the pneumatic devices. The use of directional control valves simplifies the job of controlling air flow to multiple pneumatic devices.

Learning Objectives

By the end of this course, you will be able to do the following:

- Explain the purpose of a directional control valve
- Demonstrate how a directional control valve works
- Understand the types of directional control valves
- Be able to classify directional control valves by their function and method of operation
- Be able to classify them by the manner in which they are actuated
- Identify the type of valve from a schematic symbol
- Explain the different types of valve actuation

Estimated completion time (hours): 1.8

PNE-2004 VACUUM TECHNOLOGY

Course Description

Vacuum is a technology used in an automated system to lift and move products and materials. Like pneumatics, vacuum technology is based upon some of the basic laws of science and physics, but with some differences.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the physical laws that are used in vacuum technology
- Explain the importance of pressure when creating a vacuum
- Explain how a vacuum is generated
- List the types of vacuum
- Define the components that are used in a vacuum system
- Identify the symbols that are used for vacuum components

Estimated completion time (hours): 2.1

PNE-2005 MEASURING PNEUMATIC VARIABLES

Course Description

The behavior of a pneumatic system is controlled by the pneumatic variables of pressure and flow. Proper measurement and monitoring of these variables is critical to the performance of the pneumatic system.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand pressure
- Understand flow
- Define the instruments that are used to measure pressure and flow
- Explain how these instruments function
- Identify the units of measure for pressure and flow
- Explain the function of pressure and flow switches

Estimated completion time (hours): 1.3

PNEUMATIC APPLICATIONS

PNE-3001 PNEUMATIC APPLICATIONS

Course Description

There are countless applications of pneumatic technology in the world. Many of the applications share the same components and circuitry logic. In this course, you will learn how to build and operate several pneumatic and electro-pneumatic systems.

Learning Objectives

By the end of this course, you will be able to do the following:

- Draw basic electro-pneumatic circuits
- Assemble electro-pneumatic circuits
- Use pneumatic symbols to represent electro-pneumatic circuits
- Understand the basic logic of the electro-pneumatic circuits

Estimated completion time (hours): 1.8

ROBOTICS COURSES

ROBOTICS

ROB-1001 INTRODUCTION TO ROBOTICS

Course Description

Robotics is the study of the design, construction, and operation of robots. Robots have become an integral part in the automation of many industries.

Learning Objectives

By the end of this course, you will be able to do the following:

- List common tasks of industrial robots
- Distinguish between the types of industrial robots
- Understand the history of industrial robots

Estimated completion time (hours): 1.1

ROB-1002 ROBOT SAFETY

Course Description

Robots are used in many industrial applications. Every application presents both unique and common safety concerns. Understanding these safety concerns helps reduce the chance of injury to yourself and others.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify four types of accidents involving industrial robots
- Identify sources of hazards from an industrial robot
- Identify ANSI/RIA safety standards
- Identify PPE associated with robot operations

Estimated completion time (hours): 1.5

ROB-2001 ROBOT AXES

Course Description

The manipulator of an articulated robot is capable of reaching any point within its maximum envelope from different directions. Understanding how these points are defined is important for anyone working with an articulated robot.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the six common axes of an articulated robot
- List different coordinate systems
- Understand the differences between the coordinate systems
- Apply different coordinate systems to define the location of the same point

Estimated completion time (hours): 1.7

ROB-2002 ROBOT MANIPULATOR

Course Description

The manipulator is the component of the robot that performs the actual work of the system. Understanding the components and limitations of the manipulator is important for anyone working with a robot.

Learning Objectives

By the end of this course, you will be able to do the following:

- List types of actuators used on a manipulator
- Understand the term payload
- Understand the term armload
- List types of sensors used with a manipulator
- Define robot accuracy
- Define robot repeatability

Estimated completion time (hours): 1.3

ROB-2003 CONTROLLER AND END EFFECTORS

Course Description

The robot controller and end effector are important components of the robot system. Identifying different end effectors and the components of the controller is important information for anyone working with robots.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify the different courses of a robot controller
- Identify the functions of each course of a robot controller
- List types of end effectors
- Identify functions that can be performed with the teach pendant

Estimated completion time (hours): 1.7

ROB-2004 ROBOT PROGRAMS

Course Description

A robot requires a program to operate automatically. Understanding the required format, terms, and information of a robot program is important for many personnel working with a robot.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the importance of syntax in a robot program
- List common data types
- List methods of repeating sections of a robot program
- Understand the importance of creating a plan to write a robot program
- Understand the difference between an instruction and an argument

Estimated completion time (hours): 1.3

ROB-2005 INDUSTRIAL ROBOT APPLICATIONS

Course Description

Understanding the different applications an industrial robot may perform is important for anyone working with robots.

Learning Objectives

By the end of this course, you will be able to do the following:

- List welding processes performed by industrial robots
- List different types of arc welding
- Understand the factors affecting the quality of a friction weld
- List material handling applications for robots

Estimated completion time (hours): 1.2

TOOL MAKING COURSES

TOOLING CAPSTONE PROJECT

TOL-3001 NEED FOR TOOLS

Course Description

There are many circumstances that create the need for a new tool or modifying an old tool. Understanding the process of defining the need for a tool and the tool design process is important information for a toolmaker.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the need for a new tool
- List some common sources of information for a toolmaker
- Understand the role of the tooling engineer in the making of a tool
- Understand the role of the toolmaker

Estimated completion time (hours): 0.8

TOL-3002 THE PROCESS

Course Description

A toolmaker must decide on a series of steps, or process, to make a tool. Understanding the reasons behind a process is important information for anyone wanting to be a toolmaker.

Learning Objectives

By the end of this course, you will be able to do the following:

- Identify critical features of a tool
- Define removability
- Identify critical features or requirements on an engineering drawing

Estimated completion time (hours): 1.1

TOL-3003 PERMANENT ASSEMBLIES

Course Description

Permanent assemblies are often used as components in tools. Understanding how to produce permanent assemblies is an important skill a toolmaker will acquire.

Learning Objectives

By the end of this course, you will be able to do the following:

- Define a permanent assembly
- Understand the process of making a permanent assembly with screws and dowel pins
- Understand the function of screws and dowel pins in a permanent assembly

Estimated completion time (hours): 1.4

TOL-3004 CRITICAL FEATURES

Course Description

Creating critical features or satisfying critical requirements of a tool is usually the most difficult step in the tool making process. Understanding how this is accomplished is important for any toolmaker.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand the purpose of precision locators
- Understand how removability is attained in building a drill jig

Estimated completion time (hours): 1.0

TOL-3005 FINAL DETAILS

Course Description

Satisfying critical features and requirements of a tool often determines if a tool is functional. However, it is usually the small details of a tool that determine if the tool is user-friendly. Understanding how to make tools user-friendly is important for anyone wanting to become a toolmaker.

Learning Objectives

By the end of this course, you will be able to do the following:

- Understand how to layout a clamp for installation
- Understand the importance of deburring

Estimated completion time (hours): 1.2

WELDING COURSES

WELDING PROCESSES

WEL-2001 INTRODUCTION TO WELDING

Course Description

Welding is a common method of permanently joining metal components together. There are many processes and discontinuities associated with welding. There are also numerous symbols used to communicate the requirements of a weld.

Learning Objectives

By the end of this course, you will be able to do the following:

- List the basic arc welding process
- Identify joints and associated weld types
- Understand weld and welding symbols
- Identify weld discontinuities

Estimated completion time (hours): 1.6

WEL-2004 WELDING BASICS

Course Description

In this course, you will learn what welding is and how it is different from other allied processes, such as brazing and soldering. You will also discover the three types of welding processes, the basic joint types, and the differences between fillet welds and butt welds. Finally, you will learn how welding affects the metallurgy of the original materials.

Learning Objectives

By the end of this course, you will be able to:

- Define welding
- Describe three AWS-recognized welding processes
- Explain the basic joint types
- List the different welding positions
- Describe fillet welds and butt welds
- Explain how welding affects metallurgy

Estimated completion time (hours): 1.0

(credit hour 0.1)

WEL-2005 WELDING DEFECTS

Course Description

In this course, you will learn what a weld defect is and how it may affect the welded component. You will discover the testing techniques used to identify a weld defect, as well as what you can do to prevent most defects. You will also learn about the different types and causes of fabrication-related defects.

Learning Objectives

By the end of this course, you will be able to:

- Define weld defects
- Understand the importance of detecting weld defects
- List testing techniques used to identify weld defects
- Describe what can be done to prevent many weld defects
- Explain the difference between fabrication-related and service-related defects
- Describe the different types of fabrication-related defects

Estimated completion time (hours): 0.8

(credit hour 0.1)

WEL-2006 ARC WELDING SAFETY

Course Description

Although arc welding uses low voltages, it doesn’t come without risks. In this course, you will learn about a few of the safety hazards you may encounter while welding as well as guidelines you should follow to help you stay safe on the job. Keep in mind that covering every possible hazard and guideline is impossible, so it’s important that you follow your employer’s safety guidelines at all times.

Learning Objectives

- By the end of this course, you will be able to:
- Know who establishes the safety guidelines you should follow
 - Understand arc welding hazards
 - Describe ways to increase safety

Estimated completion time (hours): 0.8 (credit hour 0.1)

WEL-2007 ELEMENTS OF AN ARC WELDING CIRCUIT

Course Description

All arc welding processes involve the completion of an electrical circuit. In this course, you will learn about the different elements that make up an electrical circuit. you will also discover the factors you need to consider when choosing a power supply.

Learning Objectives

- By the end of this course, you will be able to:
- Explain the elements of an arc welding circuit
 - Describe types of power supplies
 - Describe types of power supply outputs
 - Explain the difference between constant voltage and constant current power supplies
 - Define duty cycle rating

Estimated completion time (hours): 0.7 (credit hour 0.1)

WEL-2008 SHIELDING

Course Description

In this course, you will learn about shielding, find out how shielding protects a weld, and discover the differences between flux shielding and gas shielding.

Learning Objectives

- By the end of this course, you will be able to:
- Define shielding
 - Understand why shielding is used
 - Describe flux shielding
 - Describe gas shielding

Estimated completion time (hours): 0.5 (credit hour 0.1)

WEL-2009 ARC WELDING PARAMETERS

Course Description

In this course, you will learn about the main operating parameters that apply to arc welding. You will discover the relationship between arc voltage and arc current. You will also find out how electrode feed rate, welding travel speed, and electrical polarity affect the welding process.

Learning Objectives

- By the end of this course, you will be able to:
- List the main operating parameters that apply to arc welding
 - Explain each operating parameter and how it affects arc welding
 - Describe the three types of electrical polarity

Estimated completion time (hours): 0.7 (credit hour 0.1)

WEL-2010 GAS METAL ARC WELDING (GMAW)

Course Description

All arc welding processes use an arc to complete a circuit and provide heat for the melting of materials. However, arc welding processes differ in how the arc is produced and controlled, how the molten weld pool is protected from oxidation, and whether it uses a consumable or nonconsumable electrode. In this course, we focus on the process of gas metal arc welding.

Learning Objectives

- By the end of this course, you will be able to:
- Describe the process of GMAW
 - List common applications for GMAW
 - Explain the advantages and limitations of GMAW
 - Describe the four modes of metal transfer
 - Understand process-specific information and variables

Estimated completion time (hours): 0.7 (credit hour 0.1)

WEL-2011 FLUX CORE ARC WELDING (FCAW)

Course Description

All arc welding processes use an arc to complete a circuit and provide heat for the melting of materials. However, arc welding processes differ in how the arc is produced and controlled, how the molten weld pool is protected from oxidation, and whether it uses a consumable or nonconsumable electrode. In this course, we focus on the process of flux core arc welding.

Learning Objectives

- By the end of this course, you will be able to:
- Describe the process of FCAW
 - List common applications for FCAW
 - Explain the advantages and limitations of FCAW
 - Describe the modes of metal transfer
 - Understand process-specific information and variables

Estimated completion time (hours): 0.5 (credit hour 0.1)

WEL-2012 GAS TUNGSTEN ARC WELDING (GTAW)

Course Description

All arc welding processes use an arc to complete a circuit and provide heat for the melting of materials. However, arc welding processes differ in how the arc is produced and controlled, how the molten weld pool is protected from oxidation, and whether it uses a consumable or nonconsumable electrode. In this course, we focus on the process of gas tungsten arc welding.

Learning Objectives

- By the end of this course, you will be able to:
- Describe the process of GTAW
 - List common applications for GTAW
 - Explain the advantages and limitations of GTAW
 - Understand process-specific information and variables

Estimated completion time (hours): 0.5 (credit hour 0.1)

WEL-2013 PLASMA ARC WELDING (PAW)

Course Description

All arc welding processes use an arc to complete a circuit and provide heat for the melting of materials. However, arc welding processes differ in how the arc is produced and controlled, how the molten weld pool is protected from oxidation, and whether it uses a consumable or nonconsumable electrode. In this course, we focus on the process of plasma arc welding.

Learning Objectives

- By the end of this course, you will be able to:
- Describe the process of PAW
 - List common applications for PAW
 - Explain the advantages and limitations of PAW
 - Understand process-specific information and variables

Estimated completion time (hours): 0.5 (credit hour 0.1)

WEL-2014 SHIELDED METAL ARC WELDING (SMAW)

Course Description

All arc welding processes use an arc to complete a circuit and provide heat for the melting of materials. However, arc welding processes differ in how the arc is produced and controlled, how the molten weld pool is protected from oxidation, and whether it uses a consumable or nonconsumable electrode. In this course, we focus on the process of shielded metal arc welding.

Learning Objectives

- By the end of this course, you will be able to:
- Describe the process of SMAW
 - List common applications for SMAW
 - Explain the advantages and limitations of SMAW
 - Understand process-specific information and variables

Estimated completion time (hours): 0.5 (credit hour 0.1)

WEL-2015 SUBMERGED ARC WELDING (SAW)

Course Description

All arc welding processes use an arc to complete a circuit and provide heat for the melting of materials. However, arc welding processes differ in how the arc is produced and controlled, how the molten weld pool is protected from oxidation, and whether it uses a consumable or nonconsumable electrode. In this course, we focus on the process of submerged arc welding.

Learning Objectives

- By the end of this course, you will be able to:
- Describe the process of SAW
 - List common applications for SAW
 - Explain the advantages and limitations of SAW
 - Understand process-specific information and variables

Estimated completion time (hours): 0.5 (credit hour 0.1)

WEL-2016 ELECTROSLAG WELDING (ESW) AND ELECTROGAS WELDING (EGW)

Course Description

All arc welding processes use an arc to complete a circuit and provide heat for the melting of materials. However, arc welding processes differ in how the arc is produced and controlled, how the molten weld pool is protected from oxidation, and whether it uses a consumable or nonconsumable electrode. In this course, we focus on the processes of electroslag welding and electrogas welding.

Learning Objectives

- By the end of this course, you will be able to:
- Describe the processes of ESW and EGW
 - List common applications for ESW and EGW
 - Explain the advantages and limitations of ESW and EGW
 - Understand process-specific information and variables

Estimated completion time (hours): 0.5 (credit hour 0.1)

WELDING FOR NDE COMMERCIAL
WEL-2003 WELDING AND WELDING DISCONTINUITIES

Course Description

In this course, you’ll learn about welding symbols, which provide a road map that helps a welder create the desired weld joints and weld types. You’ll also learn about the different arc welding processes as well as the different types of weld discontinuities.

Learning Objectives

- By the end of this course, you will be able to do the following:
- Explain the basic welding process
 - Identify weld joints and weld types
 - Understand welding symbols
 - Describe arc welding processes
 - Recognize weld discontinuities

Estimated completion time (hours): 0.9

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