2020/2021

Training Course Catalog

Release Date: July 2020

TRUMPF

Welcome to the Training Department

Located in Farmington, Connecticut, the TRUMPF Training Center encompasses 38,000 square feet of floor space with 17 classrooms and 13 machines designated specifically for training purposes. Each year over 3,400+ students come to TRUMPF to attend more than 500+ training classes. Regardless of whether you are coming here for training or sign up for our online learning options, we make sure our students have an enjoyable learning experience and acquire all the skills they need.

Browse through this catalog and find the courses you need. Knowledge leads to success.

TRUMPF Training Department is authorized by the International Association for Continuing Education and Training (IACET) as a training provider. Customers attending our training classes will receive continuing education units (CEUs) authorized by the IACET. CEUs can be translated to academic credit at many colleges and learning organizations or also used to sustain various certifications.

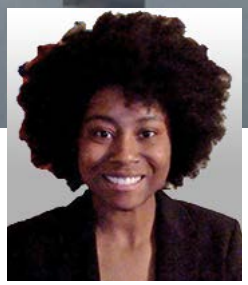
We are also granted with an official certification to train eligible VA educational beneficiaries by the Connecticut State Approving Agency. Veterans now have the opportunity to enroll in our training courses and earn CEUs at no cost.

We're fully committed. We make your employees' skills and performance our focus; your productivity and profitability our goals.

Christine Benz
Training Manager

We provide experienced instructors, in-depth training, and a state-of-the-art facility to ensure that you get the best out of your training.

Grant Hagedorn
Assistant Training Manager



The needs of the learner have evolved; accessibility, flexibility, increased retention, and just-in-time learning are requirements expressed by learners and there is no better learning platform available that meets those needs than E-learning.

eLearning Team

At TRUMPF learning is experiencing

Advanced technology topics must be taught in the right manner. This is why we design our training courses to be practical, effective and enjoyable. Our state-of-the-art training centers and facilities provide a safe and stimulating learning environment. You will interact with fellow students, your instructor and our training team. No matter whether in the classroom or at your machine and no matter your learning style, your training at TRUMPF will be both - a unique opportunity for you to develop professionally and a rewarding and lasting experience. But during a day of training, you do not only learn more about our products – breaks provide the ideal opportunity to get to know other participants or the trainers.

Discover some facts about our training centers and our range of courses.

We trained about
3,137
students last year

We offer more than
50
different courses

631
training events
last year

We provide
3 training locations in the US:
Farmington, CT, Chicago, IL
and Costa Mesa, CA

Always on the right course

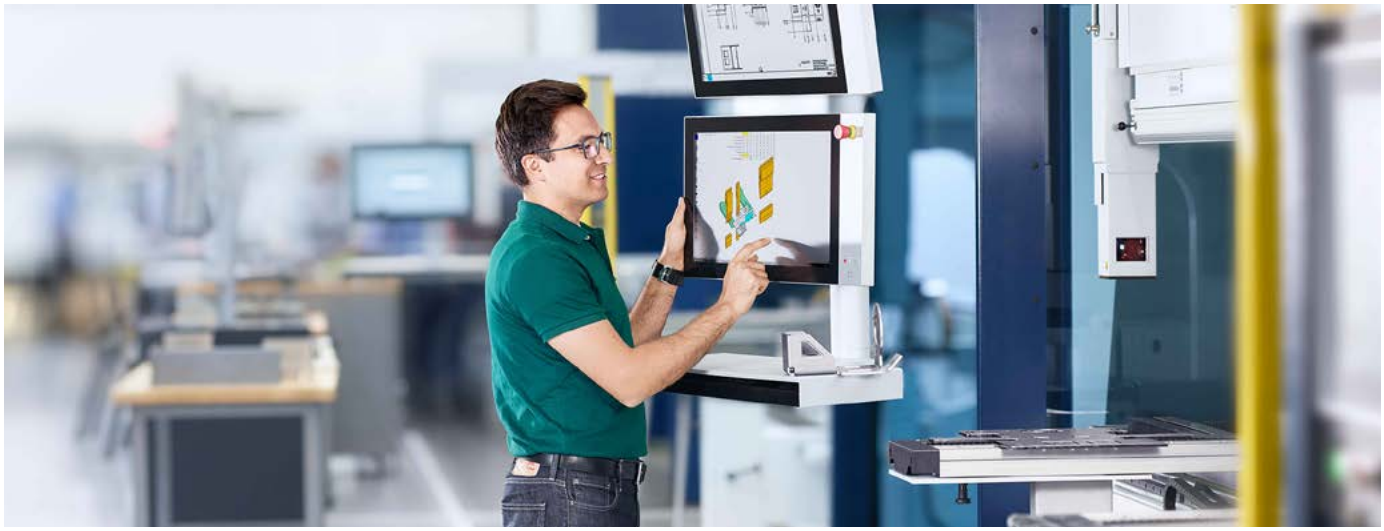
Many customers have been with TRUMPF for years. Due to changing markets and technological developments, there are always new areas of application for our products – but also new ways to learn. We make it our priority to help you identify the right courses that suit your needs and that will set you off on the right track from the very beginning. Whether it is onsite training, online or blended learning. We gladly discuss with you your individual learning needs, which will ensure your success. You'll know that you've made the right choice when you train with us.

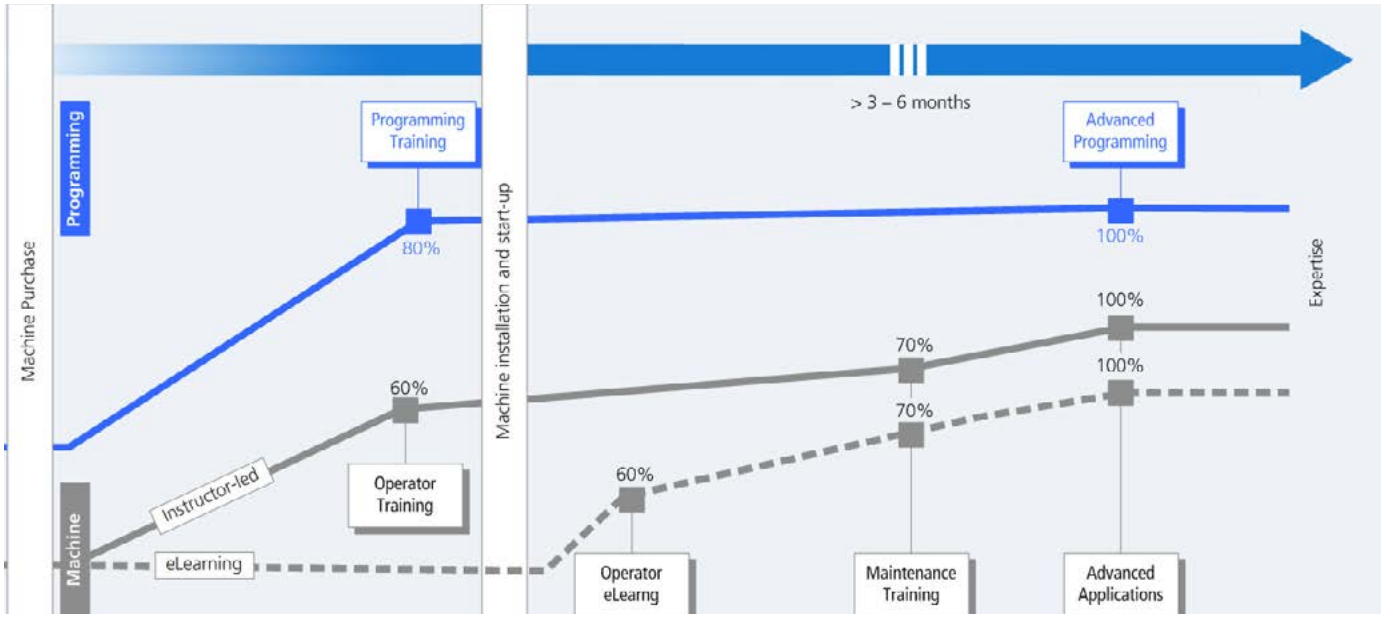
Discover what TRUMPF can provide for your individual requirements.


EXIT
FIRE
EXTINGUISHER

Road Map to Competency

With the purchase of your new TRUMPF machine, you cannot wait to run production and explore the endless applications they are capable of. To help you tap into the full potential of your machine, we have put together a multi-faceted training program. Make yourself familiar with the functions of your cutting-edge TRUMPF machine.





The timeline shows the different tracks and the sequence in which the training courses should be taken. With a bit of planning and coordination of these training events, you will not only be up-to-speed in learning the basics of your machine, with time you will also become a competent machine user to maximize your company's profitability.

Types of Training Courses

Instructor-Led Courses

Where and When
- TRUMPF Training Center
- Structured class sessions

How
- Training instructor

Instructional Material
- Printed course materials and handouts
- Multimedia presentations
- Instructor live demonstrations
- Instructor-guided hands-on practices
- Daily quizzes and reviews

Virtual-Live Courses

Where and When
- Customer's own learning environment
- Real-time/synchronous online learning
- Fixed course completion time and dates

How
- Course content delivered via web

Instructional Material
- Electronic course materials to download
- Audios, videos, simulations
- Virtual practices
- Quizzes and tests
- Chat/video-conferencing with instructor

Self-Paced Courses

Where and When
- Customer's own learning environment
- Off-line/asynchronous online learning
- Indefinite course completion time

How
- Course content delivered via web

Instructional Material
- Electronic course materials to download
- Audios, videos, simulations
- Virtual practices
- Quizzes and tests

Class Registration

Book Your Classes Online

We encourage you to book your class(es) directly on our website. Follow the link https://www.mytrumpf.com/us_training and click on the "Courses and Schedules" tab. You can browse for all courses including courses not listed in this catalog, their dates, pricing, and seating availability.

Or, if you prefer, you can contact us by phone, email, or fax. Our Training Administrators will assist you every step of the way and make your enrollment as easy as possible.

TUS_training@trumpf.com

860-255-6068

860-255-6079

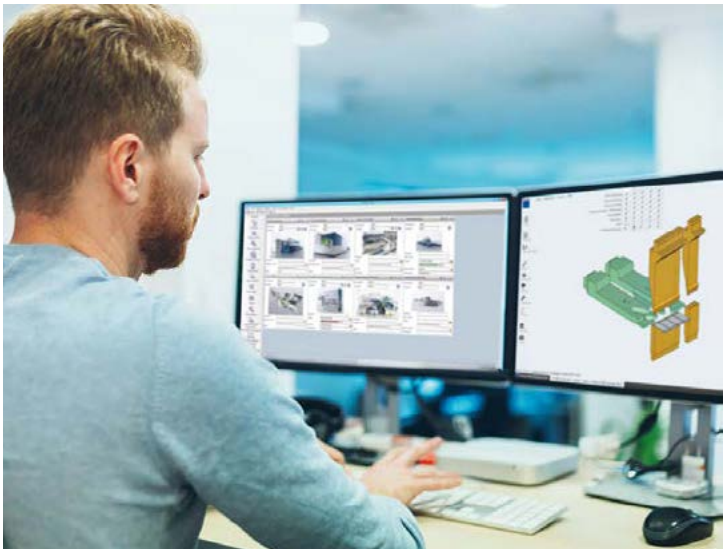
Enrollment Packet

Once we receive your registration form, we will send you a "Course Enrollment Packet." In the packet, you will find the prerequisite skills you need for different classes and what to bring to the class to make your training a successful experience. The packet also includes our company rules and our cancellation policy. Information such as hotel accommodations with special TRUMPF rates, and car rentals. Directions, transportation, and van services can also be found in the packet.

www.youtube.com/user/TRUMPFINC

www.twitter.com/TRUMPFinc

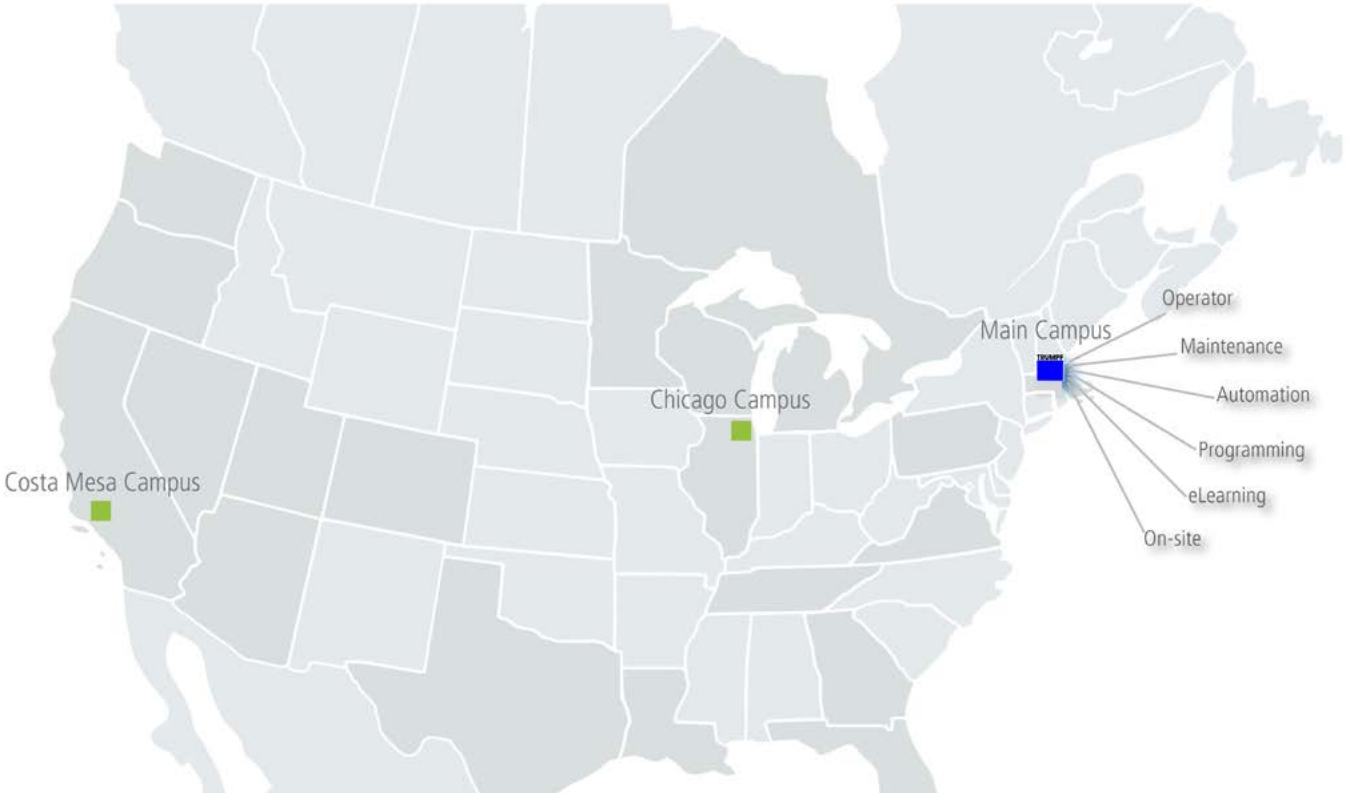
Learning for Life Training



Give all of your employees unlimited training access – anytime, anywhere. Our Learning for Life program includes all courses in the current training course catalog for Machine Tools.

Enroll any of your employees in as many courses as they need – whether it is an online class or a face to face training at one of our TRUMPF US training locations in Farmington, CT, Chicago, IL, or Costa Mesa, CA.

To get your Learning for Life Pass, please email us: tus.training@trumpf.com, or call: 1-860-255-6068



Enroll as many of your machine operators, programmers and maintenance personnel as you wish!

The minimum duration of our Learning for Life program is one year, but you can literally extend it for life

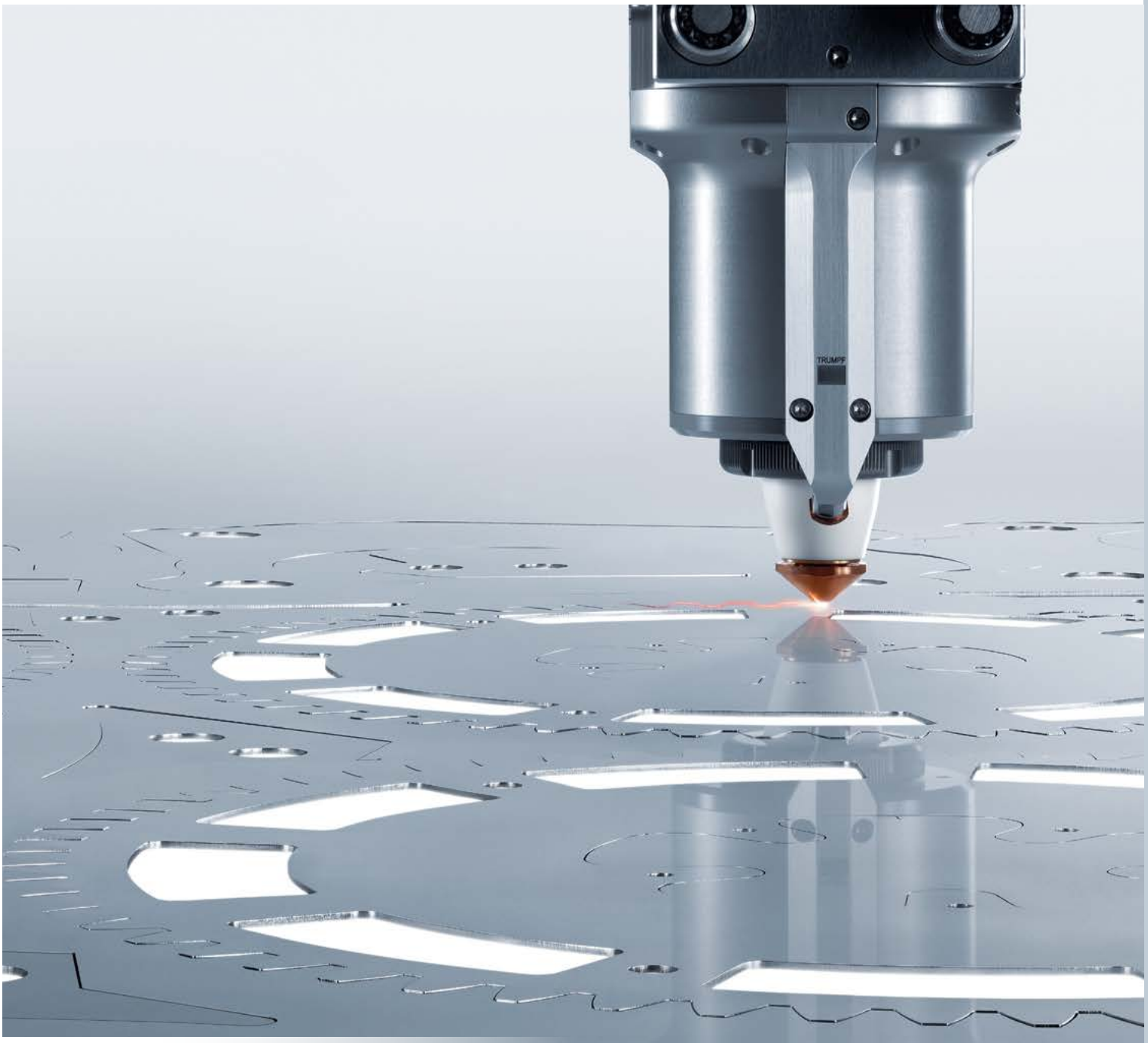
List of Courses

TruLaser			
TruLaser 1030 CO_2 - Operator	■	■	
TruLaser 3030 CO_2 - Operator	■	■	
TruLaser 1030/2030 fiber - Operator	■	■	
TruLaser 3030/5030 fiber - Operator	■		■
TruLaser 1030/3030/5030 fiber modular - Operator	■		■
TruLaser Tube 3000 fiber - Operator	■		
TruLaser Tube 5000 fiber - Operator	■	■	
TruLaser Tube 7000 fiber - Operator	■	■	
LiftMaster Compact with PartMaster - Operator (Basic)	■	■	
LiftMaster Compact with PartMaster and TruStore - Operator & Maintenance (Advanced)	■		
TruStore - Operator (Basic)	■	■	
TruLaser RotoLas - Operator	■	■	
Advanced Laser Applications	■		
TruLaser 1030 CO_2 - Maintenance	■		
TruLaser 3030 CO_2 - Maintenance 1	■		
TruLaser 3030 CO_2 - Maintenance 2	■		
TruLaser 1030/2030 fiber - Maintenance	■		
TruLaser 3030/5030 fiber - Maintenance	■	■	
TruLaser 1030/3030/5030 fiber modular - Maintenance	■		
TruLaser 1030/3030/5030 fiber modular - Maintenance (Advanced)	■		
TruLaser Tube 5000 fiber - Maintenance	■		
TruLaser Tube 7000 fiber - Maintenance	■		

■ New course

TruPunch			
TruPunch/TruMatic 1000 - Operator	■	■	
TruPunch 3000/5000 - Operator	■	■	
TruMatic 6000 - Operator	■	■	
TruMatic 7000 - Operator	■	■	
TruPunch/TruMatic 1000 - Maintenance	■		
TruPunch 5000 - Maintenance	■		
SheetMaster - Operator (Basic)	■	■	
TruBend			
TruBend 3000 with T3500T - Operator	■	■	
TruBend 5000 with TouchPoint - Operator	■	■	
TruBend 7000 with TASC - Operator	■	■	
TruBend 7000 with TouchPoint - Operator	■	■	
TruBend Cell 5000 - Operator	■	■	
TruBend Series 5000 - Maintenance	■		
ToolMaster - Operator	■		
Advanced Bending Applications	■		
Programming			
TruTops Bend Cell 5000	■	■	
TruTops Bend Inch			■
TruTops Laser Inch			■
TruTops Punch Inch			■
TruTops Tube and Tube Design	■	■	
TruTops Boost Bend	■	■	
TruTops Boost Laser	■	■	
TruTops Boost Punch	■	■	
TruTops Boost Design	■	■	
Special Class			
Sheet Metal Design	■	■	

■ On-site Training
■ New course



TruLaser

TruLaser 1030 CO_2

Operator

COURSE DESCRIPTION

The TruLaser 1030 CO_2 Operator Course machine is designed to provide students with essential technical and practical knowledge necessary to become a skilled operator. Students will learn about machine configuration, controls, specifications and capabilities as well as laser cutting principles. Upon completion of the course, students will be able to run the machine safely, manage part programs, apply appropriate cutting techniques, modify cutting parameters, perform basic maintenance duties, and produce high-quality cut parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the TruLaser 1030 CO_2 machine
- Discuss machine specifications and capabilities
- Perform machine start up and shut down safely and accurately
- Identify HMI interface components and function menus
- Identify major components on the cutting head
- Remove, disassemble, and reassemble cutting head
- Clean and/or replace cutting lens
- Perform a beam-nozzle alignment
- Perform a focus test
- Maneuver pallet changer, load material, measure sheet, and set ZPO
- Import and manage program files to/from USB and network
- Read TC_Laser_On statement, identify/modify Laser Tech Tables (LTT)
- Create/organize/delete job lists and run production
- Resume production using Flexible Entry options
- Identify variables that impact cut quality

COURSE AGENDA

- Overview of laser hazards and discuss safe laser work practices
- Discuss laser theories and TRUMPF laser design principles:
  - laser characteristics
  - laser cutting process
- Discuss major machine sub-assemblies and their functions
- Overview of machine features, e.g., FocusLine, ControlLine, etc.
- Overview of HMI control panel components and interface
- Perform basic machine operations:
  - start up the machine
  - shut down the machine
- Overview of the cutting head:
  - components on the cutting head
  - remove and reassemble the cutting head
- Overview of operator's responsibilities:
  - clean the cutting lens
  - perform nozzle alignment
  - perform focus test
- Practice running production
- Overview of various cutting techniques
- Practice cutting techniques
- Overview of laser technology tables:
  - read and understand TC_Laser_ON statement
  - modify LTT parameters, restore to default values
  - create new LTTs, rename LTTs
- Introduction to part program management:
  - import/load a program from a different source
- Discuss how to apply Flexible-Entry to resume cutting
- Demonstrate how to create job lists
- Discuss variables that affect cut quality
- Overview of basic maintenance points
- Discuss common cutting problems and solutions

TruLaser 3030 CO_2

Operator

COURSE DESCRIPTION

The TruLaser 3030 CO_2 Operator Course is designed to provide students with essential technical and practical knowledge necessary to become a skilled operator. Students will learn about machine configuration, controls, specifications and capabilities as well as laser cutting priciples. Upon completion of the course, students will be able to run the machine safely, manage part programs, apply appropriate cutting techniques, modify cutting parameters, perform basic maintenance duties, and produce high-quality cut parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the TruLaser 3030 CO_2 machine
- Discuss machine specifications and capabilities
- Perform machine start up, reference, and shut down machine safely and accurately
- Identify HMI interface components and function menus
- Identify major components on the cutting head
- Remove, disassemble, and reassemble cutting head
- Perform LensLine test and clean/replace focus lens
- Perform a beam-nozzle alignment and a lens focus test
- Maneuver pallet changer, load material, measure sheet, and set ZPO
- Import and manage program files to/from USB and network
- Read TC_Laser_On statement, identify/modify Laser Tech Tables (LTT)
- Create/organize/delete job lists and run production
- Resume production using Flexible Entry options
- Identify variables that impact cut quality
- Produce additional parts using Post Production options
- Apply Trim_Off program to trim remaining sheet material

COURSE AGENDA

- Overview of laser hazards and discuss safe laser work practices
- Discuss laser theories and TRUMPF laser design principles:
  - laser characteristics
  - laser cutting process
- Discuss major machine sub-assemblies and their functions
- Overview of machine features, e.g., FocusLine, ControlLine
- Overview of HMI control panel components and interface
- Perform basic machine operations:
  - start up the machine
  - shut down the machine
- Overview of the cutting head:
  - components on the cutting head
  - remove and reassemble the cutting head
- Overview of operator's responsibilities:
  - clean the cutting lens
  - perform nozzle alignment
  - perform focus test
- Practice running production
- Overview of various cutting techniques
- Practice cutting techniques
- Overview of laser technology tables:
  - read and understand TC_Laser_ON statement
  - modify LTT parameters, restore to default values
  - create new LTTs, rename LTTs
- Introduction to part program management:
  - import/load a program from a different source
- Discuss how to apply Flexible-Entry to resume cutting
- Demonstrate how to create job lists
- Demonstrate different Trim_Off methods
- Discuss variables that affect cut quality
- Overview of basic maintenance points
- Discuss common cutting problems and solutions

TruLaser 1030/2030 fiber

Operator

COURSE DESCRIPTION

The TruLaser 1030/2030 Fiber Operator Course is designed to provide students with essential technical and practical knowledge necessary to become a skilled operator. Students will learn about machine configuration, controls, specifications and capabilities as well as laser cutting priciples. Upon completion of the course, students will be able to run the machine safely, manage part programs, apply appropriate cutting techniques, modify cutting parameters, perform basic maintenance duties, and produce high-quality cut parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4 days

LEARNING OBJECTIVES

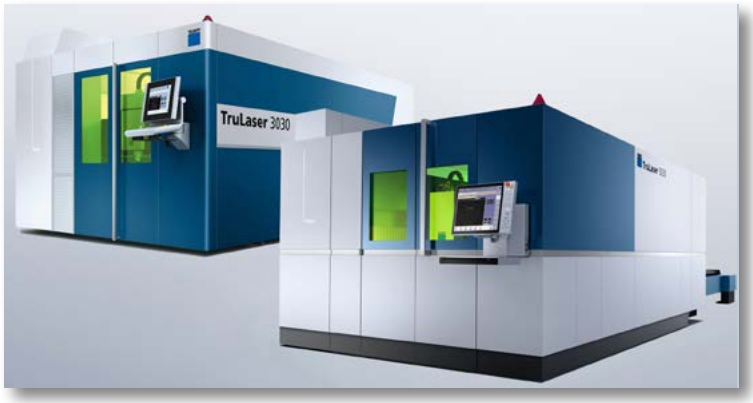
- Follow safety guidelines and demonstrate safe work practices when operating the TruLaser 1030/2030 fiber machine
- Discuss machine specifications and capabilities
- Perform machine start up, reference, and shut down machine safely and accurately
- Clean and replace the Protective glass
- Perform nozzle alignment
- Perform and evaluate a focus test
- Maneuver the pallet changer, load material, measure sheet, Set ZPO
- Copy, transfer, import and manage program files to and from USB and network
- Ability to read TC_Laser_On statement and identify/ modify Laser Tech Table (LTT)
- Create, organize, and delete job lists and run production.
- Knowledge of Shop Floor programming basics
- Resume production using Flexible Entry
- Identify cutting parameters that impact cut quality

COURSE AGENDA

- Overview of laser hazards and discuss safe laser work practices
- Discuss laser theories and TRUMPF laser design principles:
  - laser characteristics
  - laser cutting process
- Discuss major machine sub-assemblies and their functions
- Overview of machine features, e.g., FocusLine, ControlLine
- Overview of HMI control panel components and interface
- Perform basic machine operations:
  - start up the machine
  - shut down the machine
- Overview of the cutting unit:
  - components on the cutting unit
  - remove and reassemble the cartridge
- Overview of operator's responsibilities:
  - clean the protective glass
  - perform nozzle alignment
  - perform focus test
- Practice running production
- Overview of various cutting techniques
- Overview of laser technology tables:
  - read and understand TC_Laser_ON statement
  - modify, restore, create new, rename LTTs
- Introduction to part program management:
  - import/load a program from a different source
- Demonstrate how to create job lists
- Demonstrate how to proces parts and generate programs using the Shop Floor program
- Discuss how to apply Flexible-Entry to resume cutting
- Demonstrate how to run LiftMaster Shuttle in semi- and automatic modes
- Discuss common cutting problems and solutions

TruLaser 3030/5030 fiber

Operator



COURSE DESCRIPTION

The TruLaser 3030/5030 Fiber Operator Course is designed to provide students with essential technical and practical knowledge necessary to become a skilled operator. Students will learn about machine configuration, controls, specifications and capabilities as well as laser cutting principles. Upon completion of the course, students will be able to run the machine safely, manage part programs, apply appropriate cutting techniques, modify cutting parameters, perform basic maintenance duties, and produce high-quality cut parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the TruLaser 3030/5030 fiber machine
- Discuss machine specifications and capabilities
- Perform machine start up, reference, and shut down machine
- Identify HMI interface components and function menus
- Perform Protective Glass Test
- Clean and replace the protective glass
- Perform nozzle alignment
- Perform Spot Image test
- Perform and evaluate a focus test
- Read TC_Laser_On statement, identify/modify Laser Tech Table (LTT)
- Maneuver the pallet changer, load material, measure sheet, set ZPO
- Copy/transfer/import/manage program files to/from USB and network
- Create/organize/delete job lists and run production
- Resume production using Flexible Entry
- Produce parts in Post Production
- Apply Trim_Off program to trim remaining sheet material
- Discuss Shop Floor programming basics
- Identify variables that impact cut quality

COURSE AGENDA

- Overview of laser hazards and discuss safe laser work practices
- Overview of laser hazards and discuss safe laser work practices
- Discuss laser theories and TRUMPF laser design principles:
  - laser characteristics
  - laser cutting process
- Discuss major machine sub-assemblies and their functions
- Overview of machine features, e.g., FocusLine, ControlLine
- Overview of HMI control panel components and interface
- Perform basic machine operations:
  - start up the machine
  - shut down the machine
- Overview of the cutting unit:
  - components on the cutting unit
  - remove and reassemble the cartridge
- Overview of operator's responsibilities:
  - clean the protective glass
  - perform nozzle alignment
  - perform focus test
- Practice running production
- Overview of various cutting techniques
- Practice cutting techniques
- Overview of laser technology tables:
  - read and understand TC_Laser_ON statement
  - modify LTT parameters, restore to default values
  - create new LTTs, rename LTTs
- Introduction to part program management:
  - import/load a program from a different source
- Discuss how to apply Flexible-Entry to resume cutting
- Demonstrate how to create job lists
- Demonstrate different Trim_Off methods
- Demonstrate how to proces parts and generate programs using the Shop Floor program
- Discuss variables that affect cut quality
- Overview of basic maintenance points
- Discuss common cutting problems and solutions

TruLaser 1030/3030 5030 fiber modular

Operator

COURSE DESCRIPTION

The TruLaser 1030/3030/5030 Fiber Modular Operator Course is designed to provide students with essential technical and practical knowledge necessary to become a skilled operator. Students will learn about machine configuration, controls, specifications and capabilities as well as laser cutting priciples. Upon completion of the course, students will be able to run the machine safely, manage part programs, apply appropriate cutting techniques, modify cutting parameters, perform basic maintenance duties, and produce high-quality cut parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

3 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the TruLaser 1030/3030/5030 fiber modular machine
- Discuss machine specifications and capabilities
- Perform machine start up, reference, and shut down machine safely and accurately
- Identify HMI interface components and function menus
- Perform Protective Glass Test; clean and replace the Protective glass
- Perform nozzle alignment; Perform Spot Image test
- Perform and evaluate a focus test
- Maneuver the pallet changer, load material, measure sheet, set ZPO
- Copy/transfer/import/manage program files to/from USB and network
- Read TC_Laser_On statement, identify/modify Laser Tech Table (LTT)
- Create/organize/delete job lists and run production
- Resume production using Flexible Entry
- Identify variables that impact cut quality
- Produce additional parts using Post Production options
- Apply Trim_Off program to trim remaining sheet material

COURSE AGENDA

- Overview of laser hazards and discuss safe laser work practices
- Discuss laser theories and TRUMPF laser design principles:
  - laser characteristics
  - laser cutting process
- Discuss major machine sub-assemblies and their functions
- Overview of TouchPoint control panel components and interface
- Perform basic machine operations:
  - start up the machine
  - shut down the machine
- Overview of the cutting unit:
  - components on the cutting unit
  - remove and reassemble the cartridge
- Overview of operator's responsibilities:
  - perform spot image check
  - clean the protective glass
  - perform nozzle alignment
  - perform focus test
- Introduction to part program management:
  - import/load a program from a different source
- Demonstrate how to perform pallet change
- Demonstrate how to measure sheet position and set ZPO
- Practice running production
- Demonstrate different Trim_Off methods
- Overview of various cutting techniques:
  - practice cutting techniques
- Discuss how to apply Flexible-Entry to resume cutting
- Demonstrate how to create job lists
- Demonstrate how to produce parts in post-production
- Discuss variables that affect cut quality
- Discuss common cutting problems and solutions

TruLaser Tube 3000 fiber

Operator

COURSE DESCRIPTION

The TruLaser Tube 3000 Fiber Operator Course is designed to provide students with essential technical and practical knowledge necessary to become a skilled operator. Students will learn about machine configuration, controls, specifications and capabilities as well as laser cutting priciples. Upon completion of the course, students will be able to run the machine safely, manage part programs, apply appropriate cutting techniques, modify cutting parameters, manage stocks, modify tube layouts, perform basic maintenance duties, and produce high-quality tube parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the TruLaser Tube 3000 machine
- Identify major machine subassemblies, features and their functions
- Perform machine start up, reference, and shut down machine
- Identify HMI interface components and function menus
- Clean and replace protective glass
- Perform a nozzle alignment and a focus test
- Assign, import and mange tube inventory
- Create/organize/delete job lists and run production
- Unload the tube manually and assign unloading stations
- Copy/transfer/import/manage program files to/from USB and network
- Resume production using Flexible Entry
- Successfully generate a production plan
- Assign, import, and manage tube inventory
- Create/modify/mport/export allocated tubes for production (.tpp)
- Modify technology tables that impact cut quality

COURSE AGENDA

- Overview of laser hazards and discuss safe laser work practices
- Discuss laser theories and TRUMPF laser design principles:
  - laser characteristics
  - laser cutting process
- Discuss major machine sub-assemblies and their functions
- Overview of machhine features, e.g., FocusLine, ControlLine
- Overview of HMI control panel components and interface
- Perform basic machine operations:
  - start up the machine
  - shut down the machine
  - operate the loading and unloading unit
- Overview of the cutting unit:
  - components on the cutting unit
  - remove and reassemble the cartridge
- Overview of operator's responsibilities:
  - clean the protective glass
  - perform nozzle alignment
  - perform focus test
- Practice running production
- Overview of various cutting techniques
- Practice cutting techniques
- Introduction to laser technology tables:
  - read and understand TC_Laser_ON statement
  - modify LTT parameters, restore to default values
  - create new LTTs, rename LTTs
- Introduction to part program management:
  - import/load a program from a different source
- Overview stock inventories management
- Review tube layouts: create, modify, export, import
- Demonstrate how to create production plans
- Demonstrate how to use the LoadMaster (optional)
- Overview of basic maintenance points

TruLaser Tube 5000 fiber

Operator

COURSE DESCRIPTION

The TruLaser Tube 5000 Fiber Operator Course is designed to provide students with essential technical and practical knowledge necessary to become a skilled operator. Students will learn about machine configuration, controls, specifications and capabilities as well as laser cutting priciples. Upon completion of the course, students will be able to run the machine safely, manage part programs, apply appropriate cutting techniques, modify cutting parameters, manage stocks, modify tube layouts, perform basic maintenance duties, and produce high-quality tube parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the TruLaser Tube 5000 machine
- Identify major machine subassemblies, features and their functions
- Perform machine start up, reference, and shut down machine
- Identify HMI interface components and function menus
- Clean and replace protective glass
- Perform a nozzle alignment and a focus test
- Assign, import and mange tube inventory
- Create/organize/delete job lists and run production
- Load the tube manually and automatically
- Unload the tube manually and assign unloading stations
- Copy/transfer/import/manage program files to/from USB and network
- Resume production using Flexible Entry
- Successfully generate a production plan
- Assign, import, and manage tube inventory
- Create/modify/mport/export allocated tubes for production (.tpp)
- Modify technology tables that impact cut quality
- Change jaw configuration

COURSE AGENDA

- Overview of laser hazards and discuss safe laser work practices
- Discuss laser theories and TRUMPF laser design principles:
  - laser characteristics
  - laser cutting process
- Discuss major machine sub-assemblies and their functions
- Overview of machhine features, e.g., FocusLine, ControlLine
- Overview of HMI control panel components and interface
- Perform basic machine operations:
  - start up the machine
  - shut down the machine
  - operate the loading and unloading unit
- Overview of the cutting unit:
  - components on the cutting unit
  - remove and reassemble the cartridge
- Overview of operator's responsibilities:
  - clean the protective glass
  - perform nozzle alignment
  - perform focus test
- Practice running production
- Overview of various cutting techniques
- Practice cutting techniques
- Introduction to laser technology tables:
  - read and understand TC_Laser_ON statement
  - modify LTT parameters, restore to default values
  - create new LTTs, rename LTTs
- Introduction to part program management:
  - import/load a program from a different source
- Overview stock inventories management
- Review tube layouts: create, modify, export, import
- Demonstrate how to create production plans
- Demonstrate how to use the LoadMaster (optional)
- Overview of basic maintenance points
- Discuss common cutting problems and solutions

TruLaser Tube 7000 fiber

Operator

COURSE DESCRIPTION

The TruLaser Tube 7000 Fiber Operator Course is designed to provide students with essential technical and practical knowledge necessary to become a skilled operator. Students will learn about machine configuration, controls, specifications and capabilities as well as laser cutting priciples. Upon completion of the course, students will be able to run the machine safely, manage part programs, apply appropriate cutting techniques, modify cutting parameters, manage stocks, modify tube layouts, perform basic maintenance duties, and produce high-quality tube parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the TruLaser Tube 7000 machine
- Identify major machine subassemblies, features and their functions
- Perform machine start up, reference, and shut down machine
- Identify HMI interface components and function menus
- Clean and replace protective glass
- Perform a nozzle alignment and a focus test
- Assign, import and mange tube inventory
- Create/organize/delete job lists and run production
- Load the tube manually and automatically
- Unload the tube manually and assign unloading stations
- Copy/transfer/import/manage program files to/from USB and network
- Resume production using Flexible Entry
- Successfully generate a production plan
- Assign, import, and manage tube inventory
- Create/modify/mport/export allocated tubes for production (.tpp)
- Modify technology tables that impact cut quality
- Change jaw configuration

COURSE AGENDA

- Overview of laser hazards and discuss safe laser work practices
- Discuss laser theories and TRUMPF laser design principles:
  - laser characteristics
  - laser cutting process
- Discuss major machine sub-assemblies and their functions
- Overview of machhine features, e.g., FocusLine, ControlLine, etc
- Overview of HMI control panel components and interface
- Perform basic machine operations:
  - start up the machine
  - shut down the machine
  - operate the loading and unloading unit
- Overview of the cutting unit:
  - components on the cutting unit
  - remove and reassemble the cartridge
- Overview of operator's responsibilities:
  - clean the protective glass
  - perform nozzle alignment
  - perform focus test
- Practice running production
- Overview of various cutting techniques
- Practice cutting techniques
- Introduction to laser technology tables:
  - read and understand TC_Laser_ON statement
  - modify LTT parameters, restore to default values
  - create new LTTs, rename LTTs
- Introduction to part program management:
  - import/load a program from a different source
- Overview stock inventories management
- Review tube layouts: create, modify, export, import
- Demonstrate how to create production plans
- Demonstrate how to use the LoadMaster (optional)
- Overview of basic maintenance points
- Discuss common cutting problems and solutions

LiftMaster Compact with PartMaster

Operator (Basic)

COURSE DESCRIPTION

This half-day course is intended for customers with the LiftMaster Compact/Linear and the PartMaster options. Students will obtain the critical knowledge and skills to use the LiftMaster Compact/Linear and PartMaster for automatic production. The students will learn how to operate and cycle the conveyor system to maximize the unloading of parts and scrap material. Upon completion of this half-day course, students will be able to create production plans and inventories to run production fully automatic. The students will also learn how to modify suction cups and transport options as well as troubleshoot the common mechanical problems associated with suction cups and loading mechanisms.

TARGET AUDIENCE

Machine operators

PREREQUISITES

TruLaser Operator Training Course

COURSE DURATION

0.5 day

LEARNING OBJECTIVES

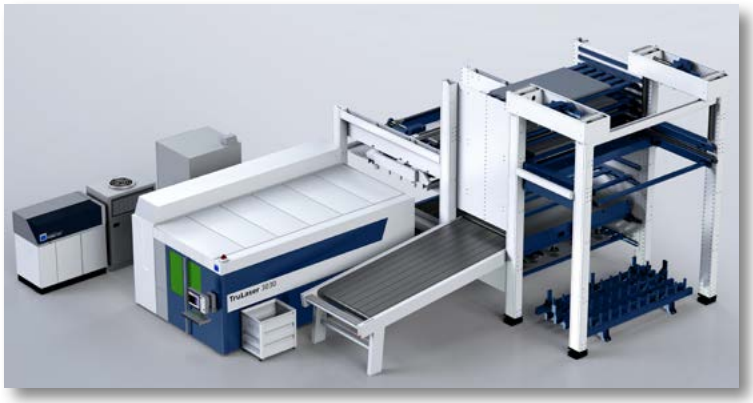
- Follow safety guidelines and demonstrate safe work practices when operating the LiftMaster Compact with PartMaster
- Identify LiftMaster Compact with PartMaster subassemblies and specifications
- Identify all control elements on Pedestal
- Perform manual loading and unloading with the LiftMaster Compact.
- Operate the LiftMaster Compact in semi-automatic mode
- Create and execute production plans in automatic mode
- Modify suction cups layout and transportation options
- Set up sheet loading/unloading options
- Modify incorrect material thickness
- Operate the PartMaster to unload finished parts
- Reset the E-stop
- Identify common LiftMaster Compact problems
- Apply the skeleton and cut part separation unto separate unloading stations

COURSE AGENDA

- Overview of potential hazards and discuss safe work practices
- Overview of LiftMaster Compact and PartMaster:
  - discuss technical data and specifications of the devices
  - discuss the control elements on the LiftMaster and PartMaster
- Perform basic operations:
  - switch the LiftMaster Compact ON and OFF
- Demonstrate and practice how to:
  - create and execute a production plan
  - create and change inventory
  - create and modify production options
- Discuss how to modify suction cup layouts
- Overview of sheet loading options and modifications
- Demonstrate operating the LiftMaster Compact in different modes:
  - manual mode
  - semi-automatic mode
  - automatic mode
- Demonstrate and practice sheet measuring
- Overview of automatic sheet separation function
- Review of PartMaster conveyor belt cycles:
  - singularly
  - concurrently (to maximize unloading)
  - incrementally
- Practice running LiftMaster Compact with the PartMaster
- Overview of basic maintenance points on the LiftMaster and PartMaster
- Demonstrate and practice how to reset the E-Stop
- Demonstrate and practice modifying incorrect material thickness
- Demonstrate separating skeletons and cut parts and unloading them to separate stations

LiftMaster Compact, PartMaster & TruStore

Operator and Maintenance (Advanced)



COURSE DESCRIPTION

This course is intended for customers with the LiftMaster Compact PartMaster, and TruStore options. Students will obtain the critical knowledge and skills to use the LiftMaster, PartMaster, and the storage for automatic production. Upon completion of this course, students will be able to create production plans, packages, and manage stock inventory for fully automtated production. The students will also learn how to modify transport options to maximize the loading and unloading process as well as troubleshoot the common problems associated with suction cups and loading mechanisms.

TARGET AUDIENCE

Machine operators

PREREQUISITES

TruLaser Operator Training Course

COURSE DURATION

3 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the LiftMaster Compact with TruStore and PartMaster
- Discuss automation subassemblies and specifications
- Identify all control elements on the LMC Pedestal and TruStore Panel
- Perform manual loading and unloading with the LiftMaster Compact
- Operate the LiftMaster Compact in semi-automatic mode
- Create and execute production plans in automatic mode
- Modify suction cups layout and transportation options
- Set up sheet loading options
- Modify incorrect material thickness
- Operate the PartMaster to unload finished parts
- Manually transport system pallets to/from storage
- Manually position axes of picker crane.
- Set up/operate lights out/day time operations
- Create/modify/delete storage location, pallet data, and stock data
- Start and exit cell server/Fab
- Check TruStore alarms with diagnostics function
- Identify routine maintenance tasks

COURSE AGENDA

- Overview of potential hazards and safety features
- Overview of LiftMaster Compact, TruStore, and PartMaster
- Perform basic operations:
  - switch the TruStore ON and OFF
  - switch the LiftMaster Compact ON and OFF
- Demonstrate and practice how to:
  - create and execute production plan
  - create and change inventory
  - create and modify production options
- Discuss how to modify suction cup layouts and sheet loading options
- Demonstrate operating the LiftMaster Compact in different modes:
  - manual mode
  - semi-automatic mode
  - automatic mode
- Demonstrate how to perform manual and automatic pallet transport using the picker crane and loading cart
- Overview of the Cell Server?Fab:
  - discuss the components on the Cell Server interface
  - prepare pallet and stock data using the storage manager
- Demonstrate and practice how to:
  - create a production plan with Technology Correction
  - operate the TruStore in automatic mode
- Discuss automatic sheet separation function and practice modifying incorrect material thickness
- Review of PartMaster conveyor belt cycles:
  - singularly, concurrently, incrementally
- Prepare TruStore for day - and lights out production
- Demonstrate and practice how to reset the E-stop
- Discuss routine maintenance points:
  - sensors, probes, encoders on LMC, PartMaster and TruStore
- Troubleshoot common mechanical problems

TruStore

Operator (Basic)

COURSE DESCRIPTION

This half-day course is intended for customers with the TruStore system. Students will obtain the critical knowledge and skills to use the TruStore for automatic production. The students will learn how to create inventory on the Cell Server, identify storage locations, track stock/modify stock data, choose a transport method, and cycle the TruStore. Upon completion of this half-day course, students will be able to run production plans with the TruStore in fully automatic mode to maximize the unloading of parts and scrap materials.

TARGET AUDIENCE

Machine operators

PREREQUISITES

TruLaser Operator Training Course

COURSE DURATION

0.5 day

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the TruStore
- Discuss TruStore subassemblies and specifications
- Identify all elements on The TruStore control panel
- Manually transport system pallets to/from storage
- Manually position axes of picker crane
- Set up/operate lights out/day time operations
- Move system pallet to raw sheet loading
- Create/modify/delete storage location, pallet data, and stock data
- Start and exit cell server
- Check TruStore alarms with diagnostics function
- Reset the E-stop
- Identify common TruStore problems

COURSE AGENDA

- Overview of potential hazards and safety features
- Overview of the TruStore components:
  - discuss technical data and specifications of the TruStore
  - discuss the control elements on the TruStore pedestal
- Perform basic operations:
  - switch the TruStore ON and OFF
- Demonstrate how to perform manual and automatic pallet transport using the picker crane and loading cart
  - automate the transport system pallets to/from storage
  - move the front storage/transfer cart with lift axis
- Overview of the Cell Server:
  - discuss the components on the Cell Server interface
  - operate the Storage Manager software
  - prepare pallet and stock data using the Storage Manager
  - load inventory into the TruStore
  - create and modify stock options
- Demonstrate and practice how to:
  - create a production plan
  - verify and modify the production options with Technology Correction
  - operate the TruStore in automatic mode
- Demonstrate and practice how to reset the E-stop
- Prepare TruStore for day and lights-out production
- Overview of basic maintenance points on the TruStore
- Demonstrate how to check alarms with the {Diagnostics} function
- Troubleshoot common TruStore problems

TruLaser RotoLas

Operator

COURSE DESCRIPTION

The TruLaser RotoLas Operator with TruTops Tube Programming course is intended for customers who already have experience running TRUMPF lasers and are ready to use their RotoLas option. The goal of this course is to provide students with critical knowledge and skills to run RotoLas, draw parts using the TruTops Tube software, and produce satisfactory RotoLas parts. Students will obtain a working knowledge of tube cutting fundamentals and operation, and how to program with TruTops Tube. Upon completion of this course, students will possess the required skills to operate RotoLas in a safe manner, maximize tube material processing capabilities, and successfully produce tube parts.

TARGET AUDIENCE

Students attend in teams with 1 operator and 1 programmer

PREREQUISITES

TruLaser Operator and/or TruTops Laser Programming courses preferred. Familiarity with CAD drawings is a plus.

COURSE DURATION

3 days

LEARNING OBJECTIVES

- Ability to set up machine for rotolas, remove pallets and covers
- Set up clamping jaws and different types of clamping jaw onfigurations
- Cut spatter guards, support disc and shims
- Modify programs for loading and clamping configurations
- Load the tube supports and alignment disc
- Run tube programs on the machine
- Use the manual functions for the rotolas feature
- Identify and customize the TruTops Tube interface
- Create round, square and rectangle tube profiles
- Draw standard intersections
- Create and save various drawing formats
- Modify contour approaches, withdraws and microjoints
- Create and modify tool path
- Identify and customize the Tube Design interface
- Import external files IGS, STEP, SLDPRT
- Identify basic maintenance points

COURSE AGENDA

- Overview of laser hazards and discuss safe laser work practices
- Discuss TRUMPF RotoLas theories and design
- Demonstrate and practice:
  - set-up the machine, remove pallets and covers, change clamping jaws
- Demonstrate how to cut shims, spatter guards, support, discs
- Review table modification options for loading, clamping, etc.
- Discuss how to apply adapters and extensions to laser head
- Overview of loading support fixture and disc
- Overview of {Setup} functions to set manual NC stop, dead areas, home position, etc.
- Overview of TruTops Tube software interface, applications, components and their functions, and sequence
- Demonstrate and practice how to import and export files
- Overview of the {Drawing} Application: create drawings with for round, square, rectangular tubes
- Discuss different ways to use 3D viewer to review drawings
- Overview of file management: manage and save drawings (files)
- Discuss how to apply tube measure
- Demonstrate and practice how to create and edit tube profiles
- Demonstrate and practice how to draw standard intersections
- Demonstrate and practice how to create GEO, ROT, RPF, VLG, RMT, and LST
- Discuss different ways to create and modify tool path
- Overview of various technology applications:
  - processing strategies, processing extras
- Demonstrate and practice how to modify contour approaches and withdrawals, and MicroJoints
- Discuss how to import *.TEO from TubeDesign
- Practice setting up the machine and running tube programs
- Practice tube cutting techniques
- Overview of basic maintenance points

Advanced Laser Applications

COURSE DESCRIPTION

The Advanced Laser Applications Course is designed for the maximization of state-of-the-art cutting technologies in TRUMPF TruLaser machines. It is intended for customers who are experienced with TRUMPF TruLaser machines. Students will gain in-depth as well as comprehensive knowledge about different types of materials, different types of cutting gases, latest cutting technologies, and programming capabilities. Students will be able to customize their newly acquired knowledge specifically to their machines, increasing productivity. Upon completion of the course, students will be able to maximize TRUMPF TruLaser machine processing capabilities, flexibility, and performance to achieve high-quality parts.

TARGET AUDIENCE

Operators experienced in operating TRUMPF TruLaser machines, and/or programmers with experience in using the TruTops Laser software

PREREQUISITES

TruLaser operator and/or TruTops Boost Laser programming courses

COURSE DURATION

2 days

LEARNING OBJECTIVES

Learning objectives for this course are based on the customers' needs and requirements.

Materials from the customers can be shipped to TRUMPF. Please contact applications@us.trumpf.com for more information.

COURSE AGENDA

- Overview of laser safety
- Overview of laser fundamentals:
  - laser nomenclature
  - laser fundamentals: beam, source, medium
- Overview of different types of laser cutting
- Overview of TRUMPF laser theories and design:
  - RF excitation theory and principles
  - coax laser theory and principles
  - disk laser theory and principles
- Overview of variables affecting laser cutting
- Discuss various cutting methods and techniques
- Overview of technology tables and processing parameters:
  - laser parameters
  - machine parameters
  - workpiece parameters
  - cutting parameters
  - piercing parameters
- Overview of laser power control:
  - overview of ramp cycles
  - modify and/or create new ramp cycles
- Discuss different ways to cut special materials:
  - brass
  - copper
  - customer's special materials
- Discuss how to assess cut quality
- Overview of advanced cutting, programming, and application techniques

TruLaser 1030 CO_2

Maintenance

COURSE DESCRIPTION

The TruLaser 1030 CO_2 Maintenance Course is intended for customer maintenance personnel to gain a solid understanding of how the machine and laser system function to keep them running at their peak performance. Students will learn about the cutting head, optics, Lanny Valve, cooling water circuit, pneumatic panel, pallet changer, catcher, and compact dust extractor. Students will also learn how to verify beam positions and obtain baseline power data. Upon completion of the course, students will be able to check, adjust, replace various components and resolve common machine problems.

TARGET AUDIENCE

Personnel with maintenance responsibility

PREREQUISITES

Basic on-the-job laser/electrical maintenance experience

COURSE DURATION

4 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when maintaining the TruLaser 1030 CO_2 machine
- Perform machine start up, reference, and shut down machine
- Identify HMI interface components and function menus
- Remove, disassemble, and reassemble cutting head
- Clean/replace cutting lens
- Perform nozzle alignment and focus test
- Collect baseline power with primes monitor
- Verify beam positions with paper shots at the near and far positions
- Inspect/remove/clean the optics on the external beam delivery path
- Replace premix gas bottle
- Perform maintenance on the catcher
- Monitor and adjust pressure inside the bellows
- Manually align the pallet changer, check and replace the tension chain
- Replace the Lanny Valve
- Discuss ControlLine problems
- Read TRUMPF schematics and troubleshoot common machine issues
- using the diagnostics function to look up I/O signals
- Create a MIO and save it to a USB

COURSE AGENDA

- Overview of laser hazards and discuss safe laser work practices
- Overview of electrical hazards and safe electrical work practices
- Overview of machine layout, machines sub-assemblies
- Discuss machine standard features/special options
- Discuss TRUMPF laser and TruCoax resonator design theory
- Overview of control elements on the HMI
- Perform basic machine operations:
  - start up and shut down the machine
  - jog axes with 3 different methods
- Discuss the {Setup} function menu for maintenance tasks
- Review of maintenance tasks on the cutting head:
  - remove and clean the cutting lens
  - perform tape shot
  - perform and evaluate focus test
- Review of maintenance tasks on the optics:
  - clean the external optics
  - clean the FocusLine filter
- Review of maintenance tasks on the Lanny Valve:
  - check Lanny Valve condition on the HMI
  - replace the Lanny Valve
  - clean the filter screens
- Discuss how to verify beam positions
- Demonstrate how to obtain baseline power data with Primes Monitor
- Review of maintenance points on the chiller unit, pneumatic panel, and the dust extractor
- Overview of maintenance points the pallet changer:
  - reset pallet homing position
  - check pallet chain tension
  - replace/adjust pallet index sensors
- Review of maintenance tasks for the catcher
- Discuss common machine problems and solutions
  - {Diagnostics} function menu
  - how to read an error message
  - how to read TRUMPF schematics
  - create MIO files

TruLaser 3030 CO_2

Maintenance - 1

COURSE DESCRIPTION

TruLaser 3030 CO_2 Maintenance 1 is the first course in TRUMPF's two-part *Maintenance Training* course series. This course focuses on the laser system and the optics, e.g., internal and external optics, beam alignment, and laser power adjustment. The goal of this course is to provide students with essential knowledge and skills to carry out proper maintenance to ensure fault-free machine operation. Upon completion of this course, students will be able to check, adjust, replace various components, and troubleshoot common machine-related problems with schematics.

TARGET AUDIENCE

Personnel with maintenance responsibility

PREREQUISITES

TruLaser 3030 CO_2 Operator Course, or on-the-job laser/electrical maintenance experience

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when maintaining the TruLaser 3030 CO_2 machine
- Discuss TRUMPF CO_2 TruFlow laser theory
- Perform machine start up, reference, and shut down machine
- Identify HMI interface components and function menus
- Identify major components on the cutting head
- Remove, disassemble, and reassemble the cutting head
- Perform LensLine diagnostic test, and clean/replace the focus lens
- Perform a beam-nozzle alignment (Tapeshot)
- Perform a lens focus test
- Collect baseline power data using Primes pocket monitor
- Perform laser mode evaluation and beam alignment shots with thermal paper or index card at different locations on machine
- Properly remove, inspect, and clean external optics
- Perform a resonator gas leak test.
- Check chiller water level and conductivity
- Identify maintenance schedule and points

COURSE AGENDA

- Overview of laser and electrical hazards
- Discuss safe laser and electrical work practices
- Identify machine layout and sub-assemblies
- Overview of machine features, e.g., automatic nozzle changer, ControlLine, FlyLine, SprintLine, PierceLine, LensLine, etc.
- Introduction to TRUMPF laser principles and design:
  - laser beam characteristics
  - RF excitation theory
  - resonator theory and design
  - the cutting process
- Overview of HMI control elements and function menus
- Perform basic machine operations:
  - start up the machine
  - shut down the machine
  - warm up the laser
- Discuss the {Setup} function menu for maintenance tasks
- Overview of maintenance tasks on the cutting head:
  - identify components on the cutting head
  - remove and install the cutting head
  - clean the focus lens
  - perform nozzle alignment
  - perform and evaluate focus test
  - reset lens error
- Check mode at the cutting head and 4 corners
- Collect baseline laser power data with Primes Pocket Monitor
- Demonstrate mode adjustments including pre- and final adjustments
- Demonstrate cleaning the external mirrors
- Demonstrate aligning the beam path in the work area
- Review of additional maintenance points
- Discuss common machine problems and solutions

TruLaser 3030 CO_2

Maintenance - 2

COURSE DESCRIPTION

TruLaser 3030 CO_2 Maintenance 2 is the second part in TRUMPF's two-part *Maintenance Training* course series. This course focuses on maintenance tasks related to mechanical components, e.g., the RF generator, TASC controller, modular cabinets, ControlLine, bus systems, Gateway module, and pallet changer. The goal of this course is to provide students with essential knowledge and skills to carry out proper maintenance to ensure fault-free machine operation. Upon completion of this course, students will be able to check, adjust, replace various components, and resolve common machine problems.

TARGET AUDIENCE

Personnel with maintenance responsibility

PREREQUISITES

TruLaser 3030 (L20) Maintenance - 1 Training Course

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

- Review of electrical and RF safety guidelines and practices when maintaining the TruLaser 3030 CO_2 machine
- Discuss how laser gases affect laser power and cutting
- Name major components inside gas cabinet and their functions
- Set gas mixer, adjust gas flow rates, and set correct pressure on the pilot dome regulator
- Establish gas exchange duty cycles
- Diagnose gas system-related problems using the IMC 15 frequency convertor
- Name five major subassemblies inside the RF cabinet and their functions
- Record RF data values for diagnosing gas-related RF generator issues
- Replace RF amplifier tube
- Discuss the TASC Laser controller and troubleshoot controller faults
- Identify different bus systems used for specific CO_2 machines
- Set Profibus and IP address and troubleshoot problems
- Read TRUMPF schematics and troubleshoot common machine problems using the I/O diagnostics function

COURSE AGENDA

- Discuss safe electrical and RF work practices
- Perform basic maintenance on the gas and vacuum system:
  - set pressure on the pilot dome regulator
  - determine and adjust gas exchange duty cycles
- Introduction to RF cabinet:
  - discuss RF theory
  - discuss the functions and characteristics of individual RF subassemblies
  - review of maintenance tasks in the RF sub-assemblies
  - calibrate RF characteristic curves
  - troubleshoot RF generator faults with error list
- Overview of the TASC controller:
  - explain the role of TASC in the laser control
  - analyze the functions of various circuit boards
  - troubleshoot TASC controller faults by means of error list
- Overview of layout and components inside the modular cabinet
- Introduction to the bus systems, including TRUMPF bus, ProfiBus, and ASI bus
- Review of maintenance tasks on the Gateway module
- Introduction to TRUMPF schematics:
  - identify schematic symbols
  - identify major sections in TRUMPF schematic manual(s)
  - practice tracing signals using the schematics manual(s)
- Discuss ControlLine functions and common faults
- Overview of the pallet changer:
  - operate the pallet changer
  - identify components on the pallet changer
  - perform maintenance on the pallet changer
  - troubleshoot pallet changer faults with schematics
- Discuss common machine problems and solutions

TruLaser 1030/2030 fiber

Maintenance

COURSE DESCRIPTION

The TruLaser 1030/203 Fiber Maintenance Course is intended for customer maintenance personnel to gain a solid understanding of how the machine and laser system function to keep them running at their peak performance. Students will learn about the cutting unit, Lanny Valve, cooling circuit, pneumatic panel, pallet changer, catcher, and compact dust extractor. Upon completion of the course, students will be able to check, adjust, replace various components and resolve common machine problems.

TARGET AUDIENCE

Personnel with maintenance responsibility

PREREQUISITES

Basic on-the-job laser/electrical maintenance experience

COURSE DURATION

3.5 days

LEARNING OBJECTIVES

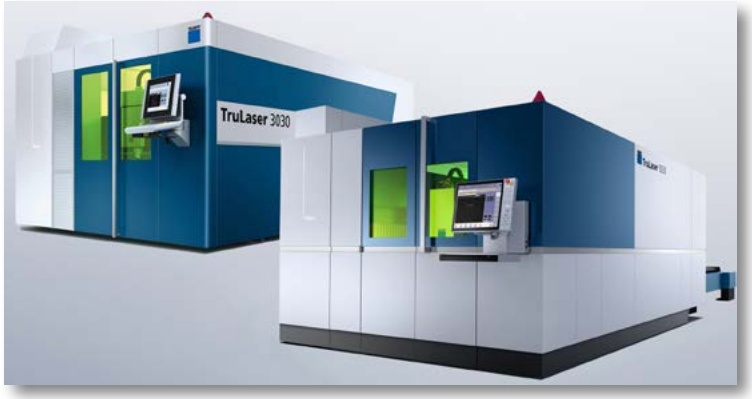
- Follow safety guidelines and demonstrate safe work practices when maintaining the TruLaser 1030/2030 fiber modular machine
- Start up, reference, and shut down the machine safely and accurately
- Identify HMI menus and tabs and TruControl 1000 software
- Clean protective glass
- Center beam to the nozzle (Tape Shot) and Focus test
- Perform spot image test
- Perform maintenance tasks related to catcher and suction unit
- Perform water replacement/treatment
- Troubleshoot Lanny Valve problems
- Perform machine backup and restore
- Identify various maintenance schedules
- Discuss machine features
- Identify common cut quality issues
- Setup and calibrate nozzle changer
- Perform pallet changer maintenance
- Read TRUMPF schematics and troubleshoot common machine problems using the diagnostics function to look up I/O signals

COURSE AGENDA

- Overview of laser and electrical hazards and safe work practices
- Overview of machine layout, machines sub-assemblies
- Discuss machine standard features/special options
- Discuss TRUMPF laser and TruDisk resonator design theory
- Overview of control elements on the HMI
- Perform basic machine operations
- Discuss the {Setup} function menu for maintenance tasks
- Review of maintenance tasks on the cutting unit:
  - remove and clean the protective glass
  - perform tape shot
  - perform and evaluate focus test
- Overview of laser air cleaner maintenance, removal, and replacement
- Review of maintenance tasks on the Lanny Valve:
  - check Lanny Valve condition on the HMI
  - replace the Lanny Valve
  - clean the filter screens
- Discuss how to verify beam quality
- Review of maintenance points on the chiller unit, pneumatic panel, and the dust extractor
- Overview of maintenance points the pallet changer:
  - reset pallet homing position
  - check pallet chain tension
  - replace/adjust pallet index sensors
- Discuss energy chain inspection and maintenance
- Discuss axis guide rail cleaning and lubrication maintenance
- Review of maintenance tasks on the catcher, slats (replacement), and cutting sheet stops
- Review of light barrier maintenance and alignment
- Discuss common machine problems and solutions:
  - {Diagnostics} function menu
  - how to read an error message
  - how to read TRUMPF schematics
  - create MIO files

TruLaser 3030/5030 fiber

Maintenance



COURSE DESCRIPTION

The TruLaser 3030/5030 Fiber Maintenance Course is intended for customer maintenance personnel to gain a solid understanding of how the machine and laser system function to keep them running at their peak performance. The students will learn about the cutting unit, the nozzle changer, the pallet changer as well as lubrication system, cooling circuit, and dust extracting system. Upon completion of the course, students will be able to check, adjust, replace various components and resolve common machine problems.

TARGET AUDIENCE

Personnel with maintenance responsibility

PREREQUISITES

Basic on-the-job laser/electrical maintenance experience

COURSE DURATION

4 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when maintaining the TruLaser 3030/5030 fiber machine
- Discuss TRUMPF solid-state laser theory
- Start up, reference, and shut down the machine safely and accurately
- Identify HMI interface components and function menus
- Identify and locate major machine components
- Perform Protective Glass test and clean/replace cutting lens
- Perform a nozzle alignment (Tape Shot)
- Perform spot image test
- Perform and evaluate the focus test
- Identify maintenance schedule and points
- Review pallet changer maintenance and troubleshooting
- Read TRUMPF schematics and troubleshoot common machine problems using the diagnostics function to look up I/O signals

COURSE AGENDA

- Discuss beam hazards specific to solid-state lasers
- Overview of machine layout and major sub-assemblies
- Overview of machine standard devices and optional features
- Discuss TRUMPF solid-state laser theory
- Overview of control elements on the HMI
- Perform basic machine operations
- Discuss the {Setup} function menu for maintenance tasks
- Demonstrate and practice maintenance tasks on the cutting unit:
  - remove and install the cutting unit
  - clean the protective glass
  - perform nozzle alignment
  - perform and evaluate focus test
- Demonstrate maintenance and calibration on the DetectLine
- Demonstrate how to align and calibrate the nozzle changer
- Discuss diagnostics of the TruDisk generator:
  - overview of TruControl software program and functions
  - various basic maintenance points in the TruDisk
- Overview of the lubrication system:
  - central lubrication; for motion unit and bearings
  - inspect and clean drive component
  - inspect conveyor belt lube reservoir, tubing, brush lube ports
  - sheet surface spray (optional)
- Discuss and demonstrate maintenance on the pallet changer:
  - hydraulic system, oil pump, hoses, filters
  - chain tension, replacement and lubrication
  - slat cleaning and replacement
- Discuss maintenance points on the LiftMaster Compact
- Review of maintenance tasks of the compact dust extractor
- Review of electrical and control system troubleshooting:
  - error diagnostics on the HMI
  - laser cutting parameters and problems
  - Gateway module I/O system
  - electrical schematics reading
- Discuss common machine problems and solutions

TruLaser 1030/3030 5030 fiber modular

Maintenance

COURSE DESCRIPTION

The TruLaser 1030/3030/5030 Fiber Modular Maintenance Course is intended for customer maintenance personnel to gain a solid understanding of how the machine and laser system function to keep them running at their peak performance. Students will learn about the cutting unit, the nozzle changer, the pallet changer as well as the lubrication, cooling, and dust extracting systems. Upon completion of the course, students will be able to diagnose and troubleshoot common machine- and laser-related problems.

TARGET AUDIENCE

Personnel with maintenance responsibility

PREREQUISITES

Basic on-the-job laser/electrical maintenance experience

COURSE DURATION

4 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when maintaining the TruLaser 1030/3030/5030 fiber modular machine
- Perform machine start up, reference, and shut down machine safely and accurately
- Identify HMI interface components and function menus
- Identify the theory, characteristics of a solid-state laser
- Identify and locate major machine components
- Perform Protective Glass test and clean/replace cutting lens
- Perform a nozzle alignment
- Perform spot image test
- Perform a focus test
- Identify maintenance schedule and points
- Read TRUMPF schematics and troubleshoot common machine problems using the diagnostics function to look up I/O signals

COURSE AGENDA

- Discuss beam hazards specific to solid-state lasers
- Overview of machine layout and major sub-assemblies
- Overview of machine standard devices and optional features
- Discuss TRUMPF solid-state laser theory
- Overview of control elements on the TouchPoint
- Perform basic machine operations
- Discuss the {Setup} function menu for maintenance tasks
- Demonstrate and practice maintenance tasks on the cutting unit:
  - remove and install the cutting unit
  - clean the protective glass
  - perform nozzle alignment
  - perform and evaluate focus test
- Demonstrate how to align and calibrate the nozzle changer
- Discuss diagnostics of the TruDisk generator:
  - overview of TruControl software program and functions
- Overview of the lubrication system:
  - central lubrication; for motion unit and bearings
  - inspect and clean drive component
  - inspect conveyor belt lube reservoir, tubing, brush lube ports
  - sheet surface spray (optional)
- Discuss and demonstrate maintenance on the pallet changer:
  - hydraulic system, oil pump, hoses, filters
  - chain tension, replacement and lubrication
  - slat cleaning and replacement
- Review of maintenance tasks of the compact dust extractor
- Review of electrical and control system troubleshooting:
  - error diagnostics
  - laser cutting parameters and problems
  - electrical schematics reading
- Discuss common machine problems and solutions

TruLaser 1030/3030 5030 fiber modular

Maintenance (Advanced)

COURSE DESCRIPTION

The Advanced TruLaser Fiber Modular Maintenance Course is designed for customer maintenance personnel to get in-depth customized training tailored to any or all of the topics including focus and contamination issues in the cutting unit; drive system, safety systems, and databases on the Siemens 840Dsl controller; bus systems, sensors, switches, and other components in the switch cabinet; the loading and unloading cycles and hardwares on the automation system. Each topic area will be taught by a different subject matter expert. Upon completion of the course, students will be able to check, adjust, replace various components and troubleshoot machine errors to keep their machine and laser system running at maximum performance.

TARGET AUDIENCE

Personnel with maintenance responsibility

PREREQUISITES

TruLaser Fiber Modular Maintenance Course (Basic)

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when maintaining and troubleshooting the TruLaser fiber modular machine
- Discuss technical and optical properties of the cutting unit
- Discuss water and air cooling circuits in the cutting unit
- Discuss protective glass contamination and focusing issues
- Backup a machine with the DataSave utility
- Reset boot sequence; backup and restore machine with tulbe software
- Discuss the functions of the 840Dsl and its sub-modules
- Boot up 840Dsl in different Windows system
- Troubleshoot NCK/PLC faults and drive module errors
- Read schematics and identify components inside the switch cabinet
- Diagnose and address Profibus and ASI bus problems
- Diagnose and troubleshoot safety circuit problems
- Read schematics and identify components on the automation
- Adjust sensors, switches, and other components on the automation
- Diagnose and troubleshoot automation system errors

COURSE AGENDA

- Discuss electrical safe work practices during maintenance
- Discuss the technical and optical properties of the cutting unit:
  - Z-axis components, telescope unit, motor-driven lenses, sensor modules, focal positions, drive motors, connections
- Overview of the cooling system in the cutting unit:
  - return and supply, cooling plates, drives, hoses, fans
- Discuss contamination problems of the protective glass
- Discuss focusing setting problems and possible solutions
- Demonstrate how to dis/assemble housings, cartridge, and 15° plane plate
- Demonstrate how to properly backup a machine using the Datasave utility
- Demonstrate how to reset boot sequence via BIOS
- Demonstrate how to backup and restore with tulbe software
- Discuss backup and restore features of the Beckhoff computer
- Discuss the functions of the 840Dsl and its sub-modules
- Demonstrate how to boot up 840Dsl in different Windows system
- Demonstrate how to troubleshoot machine into sections during bootup phase
- Discuss NCK/PLC faults and drive module errors
- Discuss the overall construction of the modular switch cabinet
- Demonstrate how to read schematics to identify components inside the switch cabinet
- Discuss how to diagnose and address Profibus and ASI bus problems
- Discuss how to diagnose and troubleshoot safety circuit problems
- Demonstrate and identify components on the automation system
- Demonstrate how to check, adjust, replace sensors, switches, and other components on the automation system
- Demonstrate maintenance tasks on the HER axis:
  - reference, reset zero point of the rake frame
- Demonstrate maintenance tasks on the un/loading cart system:
  - set loading and unloading positions, lift drive height
- Demonstrate how to diagnose and troubleshoot automation system errors

TruLaser Tube 5000 fiber

Maintenance

COURSE DESCRIPTION

The TruLaser Tube 5000 Fiber Maintenance Course is intended for customer maintenance personnel to gain a solid understanding of how the machine and laser system function to keep them running at their peak performance. The students will learn about the TruDisk generator including how to replace the pump module, perform maintenance on the cutting unit, the chuck, the clamps, the LoadMaster, various machine axes as well as the pneumatic systems. Upon completion of the course, students will be able to diagnose and troubleshoot common machine- and laser-related problems.

TARGET AUDIENCE

Personnel with maintenance responsibility

PREREQUISITES

Basic on-the-job laser/electrical maintenance experience

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when maintaining the Tube 5000 fiber machine
- Perform machine start up, reference, and shut down machine safely and accurately
- Identify HMI interface components and function menus
- Identify and locate major machine components
- Perform Protective Glass test and clean/replace cutting lens
- Perform a nozzle alignment
- Perform a focus test
- Identify maintenance schedule and points
- Perform basic maintenance on the loadmaster
- Perform maintenance on the clamping chuck and chuck sensor
- Perform maintenance on the light barriers
- Check and replace lubrication fluids
- Read TRUMPF schematics and troubleshoot common machine problems using the diagnostics function to look up I/O signals

COURSE AGENDA

- Discuss beam hazards specific to solid-state lasers
- Overview of machine layout and major sub-assemblies
- Discuss TRUMPF solid-state laser theory
- Perform basic machine operations
- Discuss the {Setup} function menu for maintenance tasks
- Review of maintenance tasks on the cutting head:
  - remove and clean the lens
  - perform tape shot
  - perform and evaluate focus test
- Discuss diagnostics of the TruDisk generator
- Discuss and demonstrate maintenance on the LoadMaster:
  - locate sensors and troubleshoot sensor problems
  - overview of LoadMaster drive system
  - overview of rotary encoders for machine axes
  - check axis initialization
- Discuss maintenance tasks on the clamping chuck
- Review of maintenance tasks on the E-Stop cams
- Overview of the cylinder:
  - discuss the functions of the pneumatic cylinder
  - discuss the functions of the clamp gripper stopper
- Discuss maintenance tasks on the U- and W-axes
- Demonstrate and practice maintenance on light barrier:
  - adjust the settings of the light barrier for the unloading unit
  - set the transmitter and the receiver
  - set the light barrier for the scrap/part removal
- Overview of the lubrication system:
  - central lubrication; for motion unit and bearings
  - inspect and clean drive components
  - conveyor belt: lube reservoir, tubing, brush lube ports
  - sheet surface spray (optional)

TruLaser Tube 7000 fiber

Maintenance

COURSE DESCRIPTION

The TruLaser Tube 7000 Fiber Maintenance Course is intended for customer maintenance personnel to gain a solid understanding of how the machine and laser system function to keep them running at their peak performance. The students will learn about the TruDisk generator including how to replace the pump module, perform maintenance on the cutting unit, the chuck, the clamps, the LoadMaster, various machine axes as well as the pneumatic systems. Upon completion of the course, students will be able to diagnose and troubleshoot common machine- and laser-related problems.

TARGET AUDIENCE

Personnel with maintenance responsibility

PREREQUISITES

Basic on-the-job laser/electrical maintenance experience

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when maintaining the Tube 7000 fiber machine
- Perform machine start up, reference, and shut down machine safely and accurately
- Identify HMI interface components and function menus
- Identify and locate major machine components
- Perform Protective Glass test and clean/replace cutting lens
- Perform a nozzle alignment
- Perform a focus test
- Identify maintenance schedule and points
- Perform basic maintenance on the loadmaster
- Perform maintenance on the clamping chuck and chuck sensor
- Perform maintenance on the light barriers
- Check and replace lubrication fluids
- Read TRUMPF schematics and troubleshoot common machine problems using the diagnostics function to look up I/O signals

COURSE AGENDA

- Discuss beam hazards specific to solid-state lasers
- Overview of machine layout and major sub-assemblies
- Discuss TRUMPF solid-state laser theory
- Perform basic machine operations
- Discuss the {Setup} function menu for maintenance tasks
- Review of maintenance tasks on the cutting head:
  - remove and clean the lens
  - perform tape shot
  - perform and evaluate focus test
- Discuss diagnostics of the TruDisk generator
- Discuss and demonstrate maintenance on the LoadMaster:
  - locate sensors and troubleshoot sensor problems
  - overview of LoadMaster drive system
  - overview of rotary encoders for machine axes
  - check axis initialization
- Discuss maintenance tasks on the clamping chuck
- Review of maintenance tasks on the E-Stop cams
- Overview of the cylinder:
  - discuss the functions of the pneumatic cylinder
  - discuss the functions of the clamp gripper stopper
- Discuss maintenance tasks on the U- and W-axes
- Demonstrate and practice maintenance on light barrier:
  - adjust the settings of the light barrier for the unloading unit
  - set the transmitter and the receiver
  - set the light barrier for the scrap/part removal
- Overview of the lubrication system:
  - central lubrication; for motion unit and bearings
  - inspect and clean drive components
  - conveyor belt: lube reservoir, tubing, brush lube ports
  - sheet surface spray (optional)

TruPunch

TruPunch/TruMatic 1000

Operator

COURSE DESCRIPTION

The TruPunch/TruMatic 1000 Operator Course is intended for customers who have limited or no prior operating experience to gain critical technical and practical knowledge necessary to become a skilled operator. Students will develop a working knowledge of machine configuration, punching and laser theories, punching head/laser cutting unit, and punching tools. Upon completion of the course, the students will be able to run the machine in a safe manner, manage tools, maximize material processing capabilities, evaluate and improve part quality, perform basic maintenance duties, and produce high-quality punched and cut parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4 days without automation/4.5 days with automation

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the TruPunch/TruMatic 1000 machine
- Discuss machine specifications and capabilities
- Perform machine start up, reference, and shut down machine safely and accurately
- Identify HMI interface components and function menus
- Identify various types of tools, calculate die clearances and tool dimensions
- Set up tooling, alignment rings, and stripper plate selection
- Perform maintenance on the cutting unit
- Copy/transfer/import/manage program files to/from USB and network
- Run production
- Resume production using Flexible Entry
- Safely and successfully operate the SheetMaster (if applicable)
- Identify various maintenance points
- Troubleshoot common tooling and machine problems

COURSE AGENDA

- Discuss punch and laser safety and safe work practices
- Overview of TRUMPF punch and laser principles
- Discuss machine specifications and working ranges
- Introduction to tooling:
  - types of punches: standard, long, and special
  - types of dies: size 1, size 2
  - stripper and alignment ring
- Discuss die clearance and its importance
- Demonstrate and practice how to correctly measure the punch and die dimensions
- Perform basic machine operations:
  - start up, reference, and shut down the machine
- Overview of tooling:
  - measure tool dimensions with caliper and QuickSet
  - set up alignment ring, stripper plate, tool cartridge
- Overview of HMI control elements and menus
- Demonstrate maintenance on the cutting unit:
  - clean protective glass
  - perform tape shot
  - perform focus test
- Overview of part program management
- Practice running production
- Practice applying flexible-entry to resume operation
- Introduction to tooling data in the tooling library
- Demonstrate basic SheetMaster Compact operations:
  - modify SheetMaster load/unload cycles
- Overview of basic maintenance tasks
- Overview of basic maintenance on the SheetMaster:
  - set the reference position
  - perform alignment adjustment
  - troubleshoot SheetMaster Compact common problems
- Discuss common machine problems and solutions

TruPunch 3000/ 5000

Operator

COURSE DESCRIPTION

The TruPunch 3000/5000 Operator Course is intended for customers who have limited or no prior operating experience to gain critical technical and practical knowledge necessary to become a skilled operator. Students will develop a working knowledge of machine configuration, punching theories, punching head, and punching tools. Upon completion of the course, the students will be able to run the machine in a safe manner, manage tools, maximize material processing capabilities, evaluate and improve part quality, perform basic maintenance duties, and produce high-quality punched and cut parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4 days without automation/4.5 days with automation

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating TruPunch 3000/5000 machines
- Discuss machine specifications and capabilities
- Perform machine start up, reference, and shut down machine safely and accurately
- Identify HMI interface components and function menus
- Identify various types of tools, calculate die clearances and tool dimensions
- Set up tooling, alignment rings, and stripper plate selection
- Copy/transfer/import/manage program files to/from USB and network
- Run production
- Resume production using Flexible Entry
- Safely and successfully operate the SheetMaster (if applicable)
- Identify various maintenance points
- Troubleshoot common tooling and machine problems

COURSE AGENDA

- Discuss punch safety and safe work practices
- Overview of machine specifications and working ranges
- Introduction to tooling:
  - types of punches: standard, extended, and special
  - types of dies: size 1, size 2
  - die clearance
- Discuss clearance and its influence on part quality
- Perform basic machine operations:
  - start up the machine
  - shut down the machine
  - reference the machine
- Overview of tooling maintenance tasks:
  - measure tool dimensions with caliper and QuickSet
  - set up alignment ring, stripper plate, tool cartridge
- Overview of HMI control elements and menus
- Overview of part program management:
  - import part programs
  - delete a program
  - store part programs
  - add and delete tools from the library
- Practice applying flexible-entry to resume operation
- Introduction to tooling data in the tooling library
- Introduction to production plans
- Demonstrate how to operate the SheetMaster system
- Overview of basic maintenance points and procedures:
  - lubrication points
  - mechanical components
  - pneumatic components
  - electrical components
  - hydraulic components
- Discuss common machine problems and solutions

TruMatic 6000 fiber

Operator

COURSE DESCRIPTION

The TruMatic 6000 Fiber Operator Course is intended for customers who have limited or no prior operating experience to gain critical technical and practical knowledge necessary to become a skilled operator. Students will develop a working knowledge of machine configuration, punching and laser theories, punching head/laser cutting unit, and punching tools. Upon completion of the course, the students will be able to run the machine in a safe manner, manage tools, maximize material processing capabilities, evaluate and improve part quality, perform basic maintenance duties, and produce high-quality punched and cut parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4 days without automation/4.5 days with automation

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the TruMatic 6000 machine
- Discuss machine specifications and capabilities
- Perform machine start up, reference, and shut down machine safely and accurately
- Identify HMI interface components and function menus
- Identify various types of tools, calculate die clearances and tool dimensions
- Set up tooling, alignment rings, and stripper plate selection
- Perform maintenance on the cutting unit
- Copy/transfer/import/manage program files to/from USB and network
- Run production
- Resume production using Flexible Entry
- Safely and successfully operate the SheetMaster (if applicable)
- Identify various maintenance points
- Troubleshoot common tooling and machine problems

COURSE AGENDA

- Discuss punch and laser safety and safe work practices
- Overview of TRUMPF punch and laser principles
- Discuss machine specifications and working ranges
- Introduction to tooling:
  - types of punches: standard, long, and special
  - types of dies: size 1, size 2
  - stripper and alignment ring
- Discuss die clearance and its importance
- Demonstrate and practice how to correctly measure the punch and die dimensions
- Perform basic machine operations:
  - start up, reference, and shut down the machine
- Overview of tooling:
  - measure tool dimensions with caliper and QuickSet
  - set up alignment ring, stripper plate, tool cartridge
- Overview of HMI control elements and menus
- Demonstrate maintenance on the cutting unit:
  - clean protective glass
  - perform tape shot
  - perform focus test
- Overview of part program management
- Practice running production
- Practice applying flexible-entry to resume operation
- Introduction to tooling data in the tooling library
- Demonstrate basic SheetMaster operations:
  - modify SheetMaster load/unload cycles
- Overview of basic maintenance points on the machine
- Overview of basic maintenance tasks on the SheetMaster:
  - set the reference position
  - perform alignment adjustment
  - troubleshoot SheetMaster common problems
- Discuss common machine problems and solutions

**The instructor-led class is offered as on-site only.

TruMatic 7000

Operator

COURSE DESCRIPTION

The TruMatic 7000 Operator Course is intended for customers who have limited or no prior operating experience to gain critical technical and practical knowledge necessary to become a skilled operator. Students will develop a working knowledge of machine configuration, punching and laser theories, punching head/laser cutting unit, and punching tools. Upon completion of the course, the students will be able to run the machine in a safe manner, manage tools, maximize material processing capabilities, evaluate and improve part quality, perform basic maintenance duties, and produce high-quality punched and cut parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4 days without automation/4.5 days with automation

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the TruMatic 7000 machine
- Discuss machine specifications and capabilities
- Perform machine start up, reference, and shut down machine safely and accurately
- Identify HMI interface components and function menus
- Identify various types of tools, calculate die clearances and tool dimensions
- Set up tooling, alignment rings, and stripper plate selection
- Perform maintenance on the cutting unit
- Copy/transfer/import/manage program files to/from USB and network
- Run production
- Resume production using Flexible Entry
- Safely and successfully operate the SheetMaster (if applicable)
- Overview of various maintenance points
- Troubleshoot common tooling and machine problems

COURSE AGENDA

- Discuss punch and laser safety and safe work practices
- Overview of TRUMPF punch and laser principles
- Discuss machine specifications and working ranges
- Introduction to tooling:
  - types of punches: standard, long, and special
  - types of dies: size 1, size 2
  - stripper and alignment ring
- Discuss die clearance and its importance
- Demonstrate and practice how to correctly measure the punch and die dimensions
- Perform basic machine operations:
  - start up, reference, and shut down the machine
- Overview of tooling:
  - measure tool dimensions with caliper and QuickSet
  - set up alignment ring, stripper plate, tool cartridge
- Overview of HMI control elements and menus
- Demonstrate maintenance on the cutting unit:
  - clean laser lens
  - perform tape shot
  - perform focus test
- Overview of part program management
- Practice running production
- Practice applying flexible-entry to resume operation
- Introduction to tooling data in the tooling library
- Demonstrate basic SheetMaster operations:
  - modify SheetMaster load/unload cycles
- Overview of basic maintenance points on the machine
- Overview of basic maintenance tasks on the SheetMaster:
  - set the reference position
  - perform alignment adjustment
  - troubleshoot SheetMaster common problems
- Discuss common machine problems and solutions

TruPunch/TruMatic 1000

Maintenance

COURSE DESCRIPTION

The TruPunch/TruMatic 1000 Maintenance Course is designed to provide students with a solid understanding of how the machine functions in order to keep it running at its peak performance. The students will learn the essential knowledge and skills required to successfully maintain their machine, prevent breakdowns, and keep their machine performing at its fullest capacity. Upon completion of this course, students will be able to check, adjust, replace various components, and resolve common machine problems.

TARGET AUDIENCE

Personnel with maintenance responsibility

PREREQUISITES

Basic on-the-job laser/electrical maintenance experience

COURSE DURATION

4.5 days with automation

LEARNING OBJECTIVES

- Identify potential hazards during maintenance
- Identify major machine sub-assemblies and components
- Remove the cutting unit, inspect and clean the protective glass
- Perform tape shot (beam-nozzle alignment) and focus test
- Adjust the offset between the laser beam and the punching head
- Perform maintenance on the stripper adapter and stripper segment
- Check ram working positions
- Adjust concentricity
- Align and perform maintenance on the die base adapter
- Set parallelism and reference points on the C1 and C2 axes
- Replace the X-, C1-, C2-, Y1b-, Y2f-, and Y2-axis motors
- Read schematics of the hydraulic, pneumatic, and the electrical systems
- Perform maintenance on the hydraulic system
- Perform maintenance on the pneumatic system
- Perform maintenance on the SheetMaster Compact
- Verify laser output power on the HMI
- Troubleshoot common machine problems

COURSE AGENDA

- Discuss punch and laser safety and safe work practices
- Overview of control elements on the HMI
- Discuss the {Setup} function menu for maintenance tasks
- Review of maintenance tasks on the cutting unit:
  - remove and clean the protective glass
  - perform tape shot
  - perform and evaluate focus test
- Demonstrate adjusting the offset between the laser beam and the punching head
- Demonstrate removing and replacing the stripper adapter and the stripper segment
- Demonstrate adjusting the working height (position) of the ramand set the reference parameters
- Review of maintenance tasks for the die base, die base, adapter and die clamp
- Demonstrate aligning the die base with tapered dowel pins
- Discuss parallelism on C1 and C2 axes
- Discuss how to set the reference points on C1 and C2 axes
- Demonstrate replacing the X-axis motor
- Discuss how to set the reference points on the X-axis
- Demonstrate replacing the Y1b-, Y2f-, and Y2- motor
- Discuss how to set the reference points on the Y-axis
- Demonstrate replacing C1 and C2 motors
- Discuss the importance of concentricity on the C1 and C2 axes
- Review procedures for bleeding the hydraulic system for the sheet clamps
- Overview of schematics for the hydraulic, pneumatic, and the electrical systems
- Review of maintenance tasks on the SheetMaster Compact:
  - set the reference position
  - perform alignment adjustment
  - read the schematics of the pneumatic system
  - troubleshoot SheetMaster Compact common problems
- Demonstrate aligning the light barrier
- Discuss common machine problems and solutions

TruPunch 5000

Maintenance

COURSE DESCRIPTION

The TruPunch 5000 Maintenance Course is designed to provide students with a solid understanding of how the machine functions in order to keep it running at its peak performance. The students will learn the essential knowledge and skills required to successfully maintain their machine, prevent breakdowns, and keep their machine performing at its fullest capacity. Upon completion of this course, students will be able to check, adjust, replace various components, and resolve common machine problems.

TARGET AUDIENCE

Qualified maintenance personnel

PREREQUISITES

Basic understanding of electrical, hydraulic and pneumatic theories. The ability to read schematics is a plus.

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

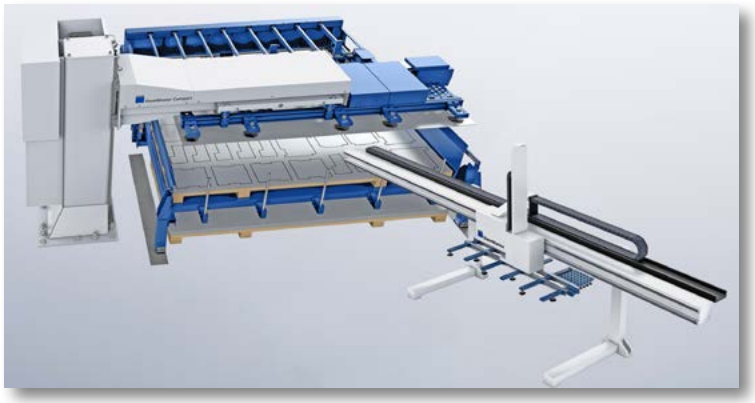
- Identify potential hazards during maintenance
- Replace the stripper receiving ring and set stripper adapter at tool change position
- Check the ram working positions and adjust the ram reference point parameters
- Replace the linear amplifier and normalize cycle for the linear amplifier
- Set the stripper sensor
- Check the LEDs on the linear amplifier
- Perform maintenance on the die base
- Replace the X-, Y-, C1-, C2-, and Z-axis motors
- Set up ProfiNet participants
- Perform backup and clone (restore) procedures
- Read hydraulic, pneumatic, and electrical schematics
- Perform maintenance on the SheetMaster
- Diagnose and troubleshoot common machine problems

COURSE AGENDA

- Discuss punch safety and safe work practices
- Overview of punch machine controls and components
- Overview of major components on the punching head
- Review of maintenance tasks on the punch head:
  - practice disassembling the punching head
  - practice adjusting ram height and ram cap position and setting reference point
  - practice checking tool clamping, piston, and wedge
  - practice removing and reinstalling stripper adapter
  - practice replacing the linear amplifier and normalizing the cycle
  - practice checking the LEDs on the linear amplifier and setting the mean position
- Discuss maintenance tasks on the major components of the die base:
  - practice disassembling the die base, checking die plate, checking die sensor, checking rotary drive, and checking and adjusting the backlash
- Demonstrate how to replace the X-, Y-, C-, and Z-axis motors
- Demonstrate setting reference points on the X-, Y-, C-, and Z-axis motors
- Review of maintenance tasks on the hydraulic, pneumatic, and the electrical systems
- Discuss how to set up the ProfiNet participants
- Overview of backup and restore procedures
- Introduction to TRUMPF schematics: for hydraulic, pneumatic, and electrical systems
- Review of maintenance tasks on the SheetMaster:
  - set the reference position
  - perform alignment adjustment
  - read the schematics of the pneumatic system
  - troubleshoot SheetMaster common problems
- Demonstrate aligning the light barrier
- Discuss common machine problems and solutions

SheetMaster

Operator (Basic)



COURSE DESCRIPTION

This half-day course is intended for customers with the SheetMaster and/or the SheetMaster Compact options. Students will obtain the critical knowledge and skills to use these systems for automatic production. The students will learn how to operate the system to maximize the unloading of parts and scrap material. Upon completion of this half-day course, students will be able to create production plans and inventories to run production fully automated. The students will also learn how to modify suction cups and unloading options as well as troubleshoot the common mechanical problems associated with suction cups and loading mechanisms.

TARGET AUDIENCE

Machine operators

PREREQUISITES

TruPunch Operator Training Course

COURSE DURATION

0.5 day

LEARNING OBJECTIVES

- Follow safety guidelines and operate the SheetMaster and/or the SheetMaster Compact in a safe manner
- Identify components on the SheetMaster and/or the SheetMaster Compact
- Create and execute production plans
- Create and change unloading options
- Operate SheetMaster in manual and automatic modes
- Modify suction cups
- Set up sheet loading options
- Modify incorrect material thickness
- Reset E-Stop button
- Troubleshoot problems related to suction cups

COURSE AGENDA

- Overview of potential hazards and safety features
- Overview of SheetMaster and/or the SheetMaster Compact:
  - discuss technical data and specifications of the devices
  - discuss the control elements
- Perform basic operations:
  - automate the SheetMaster and/or the SheetMaster Compact
- Demonstrate and practice how to:
  - create and execute a production plan
  - create and change unloading options
  - create and modify production options
- Discuss how to modify suction cup layouts
- Overview of sheet loading options and modifications
- Demonstrate operating the SheetMaster and/or the SheetMaster Compact in different modes:
  - manual mode
  - automatic mode
- Overview of automatic sheet separation and stripping functions
- Overview of basic maintenance points on the SheetMaster and/or the SheetMaster Compact
- Demonstrate and practice how to reset the E-Stop
- Demonstrate and practice modifying incorrect sheet thickness


TruBend

TruBend 3000 with T3500T

Operator

COURSE DESCRIPTION

The TruBend Series 3000 Operator Course is designed to provide students with essential technical and practical knowledge necessary to become a skilled operator. Students will learn how to operate the machine by learning bending fundamentals, machine controls, machine specifications and capabilities, tooling, basic programming, and bend sequence. Upon completion of the course, students will have the necessary skills to create accurate parts, select appropriate tooling, apply proper bending techniques, and modify bending parameters to produce high-quality bent parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

3.5 days

LEARNING OBJECTIVES

- Demonstrate safe bending work practices and follow safety guidelines to establish a safe operating environment
- Discuss bending principles and different types of bending
- Start up, reference, and shut down the machine
- Identify machine control buttons and switches
- Identify T3500T multi-touch control interface components and function menus
- Read tooling data and select the right tools
- Perform offset tool check
- Identify various backgauge configurations
- Create 1-bend part programs in Manual Mode
- Create multiple-bend NC part programs
- Create 2D part programs with BendGraph
- Create new tools and customize tool library
- Utilize the ACB angle sensor/ACB laser
- Identify basic maintenance points

COURSE AGENDA

- Overview of bending hazards and discuss safe work practices
- Overview of BendGuard
  - BendGuard modes and applications
- Overview of bending:
  - bending nomenclature, air-bending vs. bottom bending
  - bend allowance
- Overview of mobile control and footswitch:
  - mobile control buttons/foot switches
  - switch cabinet control elements
  - machine axes
- Discuss bending tools:
  - punch, die, flattening dies
  - how to read tool technical data
  - how to select proper tooling
- Overview of I-axis working range and how to set up I-axis
- Demonstrate how to load tools and perform "offset tool check"
- Demonstrate how to startup and shutdown the machine
- Overview of touch-point panel control elements
- Overview of programming applications:
  - manual programming
  - NC code programming
  - Profile Editor programming (BendGraph)
- Overview of tool library:
  - manage/import tools
  - customize tool library to reflect inventory
- Overview of basic maintenance points:
  - tool maintenance
  - maintenance points on the machine
  - maintenance checks for the bending aid (optional)

TruBend 5000 with TouchPoint

Operator

COURSE DESCRIPTION

The TruBend Series 5000 Operator Course is designed to provide students with essential technical and practical knowledge necessary to become a skilled operator. Students will learn how to operate the machine by learning bending fundamentals, machine controls, machine specifications and capabilities, tooling, programming, bend sequence, and ACB (optional). The course offers hands-on practice guided closely by the instructor. Upon completion of the course, students will have the necessary skills to create accurate parts, select appropriate tooling, apply proper bending techniques, and modify bending parameters to produce high-quality parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4 days

LEARNING OBJECTIVES

- Demonstrate safe bending work practices and follow safety guidelines to establish a safe operating environment
- Discuss bending principles and different types of bending
- Select appropriate BendGuard mode for operation
- Identify machine control buttons and switches
- Start up, reference, and shut down the machine
- Identify TouchPoint interface components and function menus
- Identify buttons on the mobile control
- Select, set up tooling, and customize tool library
- Identify backgauge configurations and set up I-axis
- Create 1-bend part programs in Manual Mode
- Create multiple-bend NC part programs
- Create 2D part programs with BendGraph
- Customize program parameters
- Utilize the ACB angle sensor/ACB laser
- Identify basic maintenance points

COURSE AGENDA

- Overview of bending hazards and discuss safe work practices
- Overview of BendGuard
  - BendGuard modes and applications
- Overview of bending:
  - bending nomenclature, air-bending vs. bottom bending
  - bend allowance
- Overview of mobile control and footswitch:
  - mobile control buttons/foot switches
  - switch cabinet control elements
  - machine axes
- Discuss bending tools:
  - punch, die, flattening dies
  - how to read tool technical data
  - how to select proper tooling
- Overview of I-axis working range and how to set up I-axis
- Demonstrate how to load tools and perform "offset tool check"
- Demonstrate how to startup and shutdown the machine
- Overview of touch-point panel control elements
- Overview of programming applications:
  - manual programming
  - NC code programming
  - Profile Editor programming (BendGraph)
- Overview of tool library:
  - manage/import tools
  - customize tool library to reflect inventory
- Discuss the ACB Angle Sensor/ACB laser:
  - what is ACB/ACB laser?
  - electronic module
  - sensor disk combinations
  - calibration of ACB and ACB configurations
  - program a learned bend
  - bend with 2 and 3 sensors
  - ACB applications and limitations
- Overview of basic maintenance points:
  - tool maintenance
  - maintenance points on the machine
  - maintenance checks for the bending aid (optional)

TruBend 7000 with TASC Controller

Operator

COURSE DESCRIPTION

The TruBend 7000 with TASC Operator Course is designed to provide students with essential technical and practical knowledge necessary to become a skilled operator. Students will learn how to operate the machine by learning bending fundamentals, machine controls, machine specifications and capabilities, tooling, programming, and bend sequence. The course offers hands-on practice guided closely by the instructor. Upon completion of the course, students will have the necessary skills to create accurate parts, select appropriate tooling, apply proper bending techniques, and modify bending parameters to produce high-quality parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

3.5 days

LEARNING OBJECTIVES

- Demonstrate safe bending work practices and follow safety guidelines to establish a safe operating environment
- Discuss bending principles and different types of bending
- Identify machine control buttons & switches
- Start up, reference, and shut down the machine
- Identify TASC interface components and function menus
- Select and position the tooling for best results
- Customize the tool inventory
- Identify various backgauge configurations
- Create programs in Manual Mode
- Create a multi-bend NC program
- Create 2D programs using BendGraph
- Customize programming parameters
- Run part programs on the machine
- Identify basic maintenance points

COURSE AGENDA

- Overview of bending hazards and discuss safe work practices
- Overview of the BendGuard:
  - BendGuard modes and applications
- Overview of bending:
  - bending nomenclature, air-bending vs. bottom bending
  - bend allowance
- Overview of TASC 6000 control panel:
  - buttons, menus, soft keys
- Overview of machine axes
- Discuss bending tools:
  - punches, dies
  - how to read tool technical data
  - how to select proper tooling
- Perform basic machine operations:
  - startup/shutdown the machine
  - reference procedure
- Demonstrate how to load tools and perform "offset tool check"
- Overview of programming applications:
  - manual programming
  - NC code programming
  - Profile Editor
- Demonstrate how to create and run programs on the machine
- Overview of basic maintenance points:
  - tool maintenance
  - maintenance points on the machine
  - maintenance checks for the bending aid (optional)

TruBend 7000 with TouchPoint

Operator

COURSE DESCRIPTION

The TruBend 7000 with TouchPoint Course is designed to provide students with essential technical and practical knowledge necessary to become a skilled operator. Students will learn how to operate the machine by learning bending fundamentals, machine controls, machine specifications and capabilities, tooling, programming, and bend sequence. The course offers hands-on practice guided closely by the instructor. Upon completion of the course, students will have the necessary skills to create accurate parts, select appropriate tooling, apply proper bending techniques, and modify bending parameters to produce high-quality parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

3.5 days

LEARNING OBJECTIVES

- Demonstrate safe bending work practices and follow safety guidelines to establish a safe operating environment
- Discuss bending principles and different types of bending
- Identify machine control buttons & switches
- Start up, reference, and shut down the machine
- Identify TouchPoint interface components and function menus
- Select and position the tooling for best results
- Customize the tool inventory
- Identify various backgauge configurations
- Create programs in Manual Mode
- Create a multi-bend NC program
- Create 2D programs using BendGraph
- Customize programming parameters
- Run part programs on the machine
- Identify basic maintenance points

COURSE AGENDA

- Overview of bending hazards and discuss safe work practices
- Overview of the BendGuard:
  - BendGuard modes and applications
- Overview of bending:
  - bending nomenclature, air-bending vs. bottom bending
  - bend allowance
- Overview of TASC 6000 control panel:
  - buttons, menus, soft keys
- Overview of machine axes
- Discuss bending tools:
  - punches, dies
  - how to read tool technical data
  - how to select proper tooling
- Perform basic machine operations:
  - startup/shutdown the machine
  - reference procedure
- Demonstrate how to load tools and perform "offset tool check"
- Overview of programming applications:
  - manual programming
  - NC code programming
  - Profile Editor
- Demonstrate how to create and run programs on the machine
- Overview of basic maintenance points:
  - tool maintenance
  - maintenance points on the machine
  - maintenance checks for the bending aid (optional)

TruBend Cell 5000

Operator

COURSE DESCRIPTION

The TruBend Cell 5000 Operator Course is intended for operators who have limited or no operating experience. The goal of this course is to provide students with critical knowledge and skills to become a proficient operator. Students will learn safe operation, load sheets, build grippers, use diferent control software for fully automtated production. Upon completion of the course, students will have the necessary skills to select appropriate tooling, apply proper bending techniques, create jobs, recognize sheets, and modify bending parameters to produce high-quality parts.

TARGET AUDIENCE

Machine operators

PREREQUISITES

Good mechanical aptitude, general knowledge of CNC control, and familiarity with measuring tools

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the TruBend Cell 5000 machine
- Discuss bending principles, types of bending, and tooling
- Identify machine and BendMaster axes and components
- Start up TruBend Cell correctly and safely
- Identify control elements on the operator panel and portable manual control unit
- Switch on BendMaster HMI
- Load, modify, or create new jobs and production packages
- Manually jog the BendMaster to different positions
- Perform rough and fine sheet recognition and height measurement
- Select and modify grippers
- Reference BendMaster axes individually
- Set the backgauge sensor system
- Run jobs and production plans
- Shut down TruBend cell correctly and safely
- Identify basic maintenance points

COURSE AGENDA

- Overview of bending hazards and discuss safe work practices
- Overview of built-in safety devices by TRUMPF:
  - Danger zone, safey cabin, BendGuard modes and applications, E-Stops
- Overview of bending:
  - bending nomenclature, air-bending vs. bottom bending
  - bend allowance
- Overview of machine and BendMaster subassembies
- Overview of operator panel and portable manual control unit
  - buttons, menus, soft keys
- Discuss bending tools:
  - punches, dies
  - how to read tool technical data
  - how to select proper tooling
- Start up the TruBend Cell
  - start up the machine and the BendMaster
  - reference the machine
- Demonstrate how to load tools and perform "offset tool check"
- Overview of the BendMaster HMI functions:
  - menus, status icons, operating modes
- Load, modify, or create new jobs and production plans
- Jog BendMaster to different positions:
  - home position, parking position, tool change position
- Set up the gripper manually or automatically:
  - specify gripper type, modify suction cups, return the gripper
- Perform rough and fine sheet recognition:
  - define area details, set height measuring point, define stack height, vertify part geometry
- Reference BendMaster axes individually
- Practice running jobs and production packages
- Shut down the TruBend Cell
- Overview of basic maintenance points:
  - tool maintenance
  - maintenance points on the machine

TruBend 5000

Maintenance

COURSE DESCRIPTION

The TruBend series 5000 Maintenance Course intended for customer maintenance and/or service personnel. The goal of this course is to provide students with the essential knowledge and skills required to successfully maintain their machine, prevent breakdowns, and keep their machine performing at its fullest capacity. Students will develop an extensive knowledge of all aspects of the internal workings of their TruBend machines. Upon completion of this course, students will be able to perform regular checks, make adjustments as needed, and resolve common machine problems in a timely manner to reduce machine downtime to a minimum.

TARGET AUDIENCE

Qualified maintenance personnel

PREREQUISITES

Basic understanding of electrical, hydraulic and pneumatic theories. The ability to read schematics is a plus.

COURSE DURATION

3.5 days

LEARNING OBJECTIVES

- Identify potential hazards during maintenance
- Identify the elements of the mobile control and pedestal control and state their proper uses
- Identify Touch-Point/TASC 6000 components and their uses for maintenance tasks
- Identify machine and back gauge axes and how axis settings affect part creation
- Start, reference, and shut down the machine
- Select the correct menu and soft keys for maintenance tasks
- Create simple maintenance programs
- Setup and qualify specific machine axes
- Discuss maintenance on the crowning motor, linear scale, lower die clamping, and drive amps
- Review of electrical schematics for maintenance purposes
- Perform basic maintenance tasks as scheduled

COURSE AGENDA

- Overview of press brake safety and discuss safe work practices
- Overview of machine control components:
  - identify control components on the mobile control
  - identify control components on the Touch-Point/TASC 6000 control panel
- Overview of machine axes and the backgauge
- Perform basic machine operations:
  - start up the machine
  - reference the machine
  - shut down the machine
- Overview of Touch-Point/TASC 6000 menus and tab keys
- Overview menus and tab keys for various maintenance tasks
- Demonstrate how to create a simple maintenance program
- Review of maintenance tasks on hydraulic valves:
  - identify all hydraulic valves and their functions
  - read hydraulic schematics
- Overview of machine axes maintenance tasks:
  - set up and qualify all axes
- Discuss maintenance tasks on the crowning motor
- Discuss maintenance tasks on the linear scale
- Review maintenance tasks on the lower die clamp
- Review maintenance tasks on the PCSS unit
- Review maintenance tasks on the drive amps
- Introduction to schematics:
  - overview of TRUMPF schematics structure/sections
  - read electrical schematics for maintenance tasks
- Review of additional maintenance points and schedules

ToolMaster

Operator

COURSE DESCRIPTION

This half-day course is intended for customers with the ToolMaster option. Students will obtain the critical knowledge and skills to use the ToolMaster for automatic production. The students will learn how to set up the tool magazine to maximize the production time. Upon completion of this half-day course, students will be able to prepare machine for the tool changing mode, store correct tools for bending programs, and adjust the Setup Plan.

TARGET AUDIENCE

Machine operators

PREREQUISITES

TruBend Operator Training Course

COURSE DURATION

0.5 day

LEARNING OBJECTIVES

- Follow safety guidelines and demonstrate safe work practices when operating the ToolMaster
- Discuss ToolMaster specifications and storage capabilities
- Identify major components and subassemblies
- Identify ToolMaster axes
- Identify control buttons and operating elements
- Perform start up and shut down safely and accurately
- Store and/or remove tools from storage
- Set up tools of a bending program
- Adjust the Setup Plan
- Identify of basic maintenance points

COURSE AGENDA

- Overview of potential hazards and discuss safe work practices
- Overview of ToolMaster:
  - discuss technical data and specifications
  - discuss storage capabilities
- Overview of ToolMaster components and subassemblies:
  - switch cabinet, docking station, chain box, manipulators, magazine rails, rotary unit, etc.
- Overview of ToolMaster axes:
  - MX1, MX2, MR1, MR2, MZ1, MZ2, TU1, TU2, SZ1, SZ2, DS1, DS2
- Overview of operating elements
- Demonstrate how to start up and shut down ToolMaster safely
- Demonstrate how to prepare machine for the tool changing mode
- Demonstrate how to properly store and remove tool from tool storage
- Demonstrate how to setup tools of a bending program
  - setup tools of a bending program with missing tools
- Demonstrate how to adjust Setup Plan
- Overview of basic maintenance points on the ToolMaster

Advanced Bending Applications

COURSE DESCRIPTION

The Advanced Bending Applications Course is designed for the maximization of state-of-the-art bending technologies in TRUMPF TruBend machines. It is intended for customers who are experienced with TruBend machines. Students will gain in-depth as well as comprehensive knowledge about different types tooling, bending technologies, bending angles, and programming capabilities. Students will be able to customize their newly acquired knowledge specifically to their machines, increasing productivity. Upon completion of the course, the students will be able to maximize TruBend machine processing capabilities, flexibility, and performance to achieve the highest quality in their parts.

TARGET AUDIENCE

Operators experienced in operating TruBend machines, or programmers experienced in using the TruTops Bend software

PREREQUISITES

TruBend Operator and/or TruTops Boost Bend Programming Courses

COURSE DURATION

3 days

LEARNING OBJECTIVES

- Acquire a broad understanding of the variety of bending capabilities of TruBend machines, TRUMPF bending tools, and advanced TruTops Bend programming techniques
- Acquire comprehensive knowledge and techniques to maximize the quality of bent parts

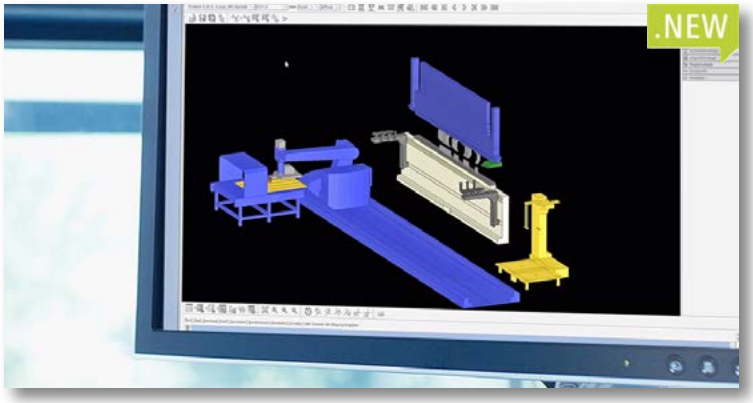
COURSE AGENDA

- Overview of bending safety and BendGuard operation principals
- Overview of bending theory:
  - bending nomenclature
  - air-bending vs. bottom bending
  - bending process, bend allowance, bend deduction
  - pressing force, tonnage, tensile strength
- Overview of machine control system:
  - control system components
- Discuss bending tools:
  - best practices for selecting tools
  - import tool drawings
  - manage the tool inventory
  - modify existing or create customized special tools
- Overview of material management
- Discuss bending methods and techniques
- Overview and demonstration of the ACB angle sensor:
  - ACB design theory and capabilities
  - compare programs using ACB vs. programs without ACB
  - modify existing programs to incorporate ACB
- Discuss 2D graphical programming using BendGraph:
  - BendGraph basics and capabilities
  - create and run 2D graphical programs
- Practice programming complicated parts
- Practice bending techniques

Programming

TruBend Cell 5000

Programming



COURSE DESCRIPTION

The TruBend Cell 5000 Programming Course is designed to provide students with the knowledge and skills to successfully create part programs for automated production. Students will obtain a working knowledge of how to import/load files, define machine and BendMaster configurations, determine the correct tool combination, apply gripper strategy, enable collistion monitoring, optimize bending sequence, and generate NC codes and Setup Plans.

TARGET AUDIENCE

Personnel with programming responsibility

PREREQUISITES

Basic PC skills are a must. Basic blueprint-reading skills are recommended. Fundamental drawing skills using a CAD package and NC programming knowledge are a plus.

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

- Discuss bending principles and types of bending
- Discuss tooling functionalities, specifications, and applications
- Identify TruBend machine and BendMaster axes and controls
- Discuss ACB sensor theory and applications
- Identify various part file formats
- Identify TroTops Bend user interface components; customize settings, workspace, and menus
- Adapt TruBend Cell configurations
- Create pallets and/or boxes for loading and unloading
- Specify stacks and stack layers
- Modify gripping positions, build new grippers, and define re-gripping strategies
- Calculate travel movement and modify calibration points
- Modify backgauge sensor system settings
- Modify bend sequence, tooling Setup Plan, and bending strategies
- Create a functionally accurate Setup Plan and generate NC code
- Manage tool inventory, create custom tools and tool list

COURSE AGENDA

- Overview of bending principle and types of bending
- Overview of tooling specifications and applications
- Overview of machine and BendMaster axes and components:
  - machine and backgauge axes, BendMaster axes
  - individual axis processing capabilities
- Overview of ACB measuring points and positioning strategies
- Overview of TruTops Bend interface:
  - tool bars, menus, buttons, navigation
  - customize configurations, settings, menus, databases
- Discuss various file formats:
  - DXF, GEO, SCDOC, SLDPRT
  - import/load, export, convert different file formats
- Adapt and/or modify machine parameters and pre-settings
- Define and simulate bending sequence:
  - bend lines, bend angles, dimensions, part weight, material
- Demonstrate how to modify automatic processings:
  - bend sequence, tooling sequence
  - collision monitoring
- Demonstrate how to create pallets and boxes for loading/unloading
- Demonstrate how to define fine recognition settings:
  - define image sections with camera, sheet position recognition
  - define height measurments, double sheet recognition
- Demonstrate how to specify stacks and stack layers
  - dependent vs indepent stack layers
  - redefine palletizing
- Demonstrate how to modify gripper settings:
  - build new grippers, set automatic gripper change, define part positions, specify re-gripping strategies
- Calculate travel movement and modify calibration points
- Modify backgauge sensor system settings
- Discuss various program results:
  - create Setup Plans
  - generate NC code
- Demonstrate how to create custom tools and tool lists:
  - produce segmented tools to use as a default tool

TruTops Bend

Programming

COURSE DESCRIPTION

The self-paced TruTops Bend Programming eLearning Course is designed to provide students with the essential knowledge and skills to successfully create part programs for production. Students will obtain a working knowledge of how to import drawing files, prepare unfolded layout, and simulate bending processes. Upon completion of this course, students will be able to create bend lines using TruTops CAD application, create 2D drawings with Profile Editor, modify bending parameters, create Setup Plans, and generate NC codes suitable for production.

TARGET AUDIENCE

Personnel with programming responsibility

PREREQUISITES

Basic PC skills are a must. Basic blueprint-reading skills are recommended. Fundamental drawing skills using a CAD package and NC programming knowledge are a plus.

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

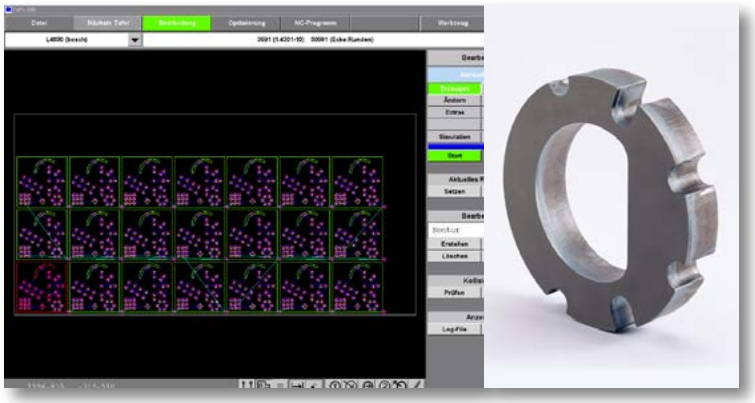
- Overview of TruBend machine controls and axes
- Discuss bend theory and tooling applications
- Discuss ACB theory and applications
- Define initial TruTops Bend parameters and presettings
- Identify TruTops Bend and TruTops CAD file extensions
- Create a functionally accurate GEO drawings
- Create a functionally accurate unfolded layout
- Create a functionally accurate Setup Plan
- Simulate bending process
- Correctly manipulate tooling selection, bend sequences, backgauge positions, and part loading in the bending application
- Create a functionally accurate NC program
- Customize TruTops Bend software databases, settings, configurations, and data menus
- Create custom tools

COURSE AGENDA

- Overview of TruBend machine axes and their fuctions
- Overview of bending theory
- Overview of tooling
- Overview of ACB
- Overview of TruTops Bend programming software:
  - interface, menus, tabs, buttons, icons
  - customize tool bar
  - parameters: general and machine-specific
- Overview of TruTops CAD and TruTops Bend file extensions
- Overview of TruTops CAD:
  - import and prepare DXFs
  - prepare unfold layout
- Overview of Profile Editor:
  - create an accurate 2D unfolded layout
  - create CEO drawings
- Overview of TruTops Unfold:
  - unfold a 3D model
- Process the unfolded layout:
  - clamping, inner contours
- Overview of Setup Plan
  - modify tooling and tooling stations
- Overview of bending process simulaton:
  - adapt bending paramenters
  - modify backgauge settings
- Create NC programs
- Overview of TruTops database customization:
  - tooling management
  - machine configuration
  - processing data
- Create new tool drawings

TruTops Laser

Programming



COURSE DESCRIPTION

The self-pased TruTops Laser Programming eLearning Course is designed to provide students with the essential knowledge and skills to successfully create part programs for production. Students will obtain a working knowledge of how to import drawing files, apply technology to single parts, nest parts, and how to maximize machining processes. Upon completion of this course, students will be able to draw parts using the TruTops CAD application, work with various macros, nest with TruTops manual and automatic nesters, apply appropriate cutting technologies and logical processing, and generate NC codes suitable for production.

TARGET AUDIENCE

Personnel with programming responsibility

PREREQUISITES

Basic PC skills are a must. Basic blueprint-reading skills are recommended. Fundamental drawing skills using a CAD package and NC programming knowledge are a plus.

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

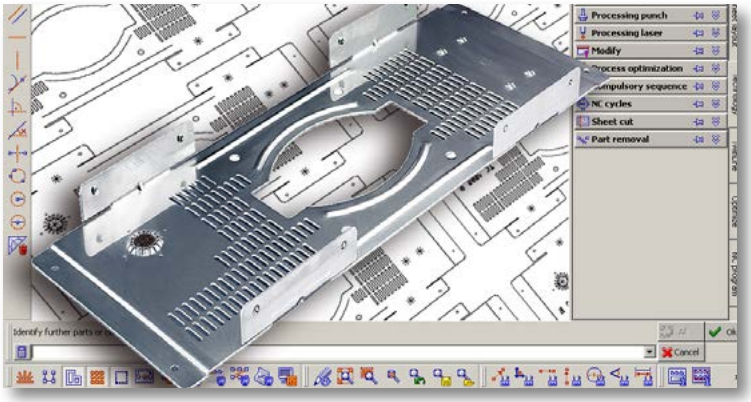
- Discuss laser cutting concepts and processes
- Discuss various types of laser cutting and machine parameters
- Identify TruTops Laser interface components and their functions
- Utilize databases related to the programming systems and machine
- Create drawing files (.geo .vlg) in the CAD application
- Create part layout on sheets in the Nesting application
- Create single part and sheet NC code in the laser application
- Discuss the tool path and interaction
- Apply proper databases (technology tables) part programs
- Apply logic (rule) of contour approaches and withdrawals

COURSE AGENDA

- Overview of TruLaser machine specifications and capabilities
- Overview of laser theory and laser cutting principles
- Overview of TruTops Laser programming software:
  - interface, menus, tabs, buttons, icons
  - customize tool bar
  - file formats
- CAD Application:
  - load and import DXF files and batch DXF conversions
  - create and edit part drawing .geo .vlg
  - create and edit standard patterns
  - save drawing files
- Nesting Application:
  - define a new sheet and create a nesting job (*.JOB)
  - create an enlarged rectangle sheet layout (*.TAF)
  - create free GEOmetry sheet layout (*.TAF)
  - create skeleton for re-nesting (*.TRG)
  - create common-line cut nests
  - create a mini nest (*.MTL)
- Laser Application:
  - automatic generation of processing
  - modify processing options: corner, piercing method
  - change the approach paths
  - modify contour sizes
  - create processing with path correction
  - avoid collision due to workpiece tilting
- Data Application:
  - set/modify machine options
  - create rules, customer rules
  - select Tech Tables
  - activate PierceLine and/or SprintLine
  - activate MicroWeld, MicroJoints
- Generate NC code for single parts and sheets

TruTops Punch

Programming



COURSE DESCRIPTION

The self-paced TruTops Punch Programming eLearning Course is designed to provide students with the essential knowledge and skills to successfully create part programs for production. Students will obtain a working knowledge of how to import drawing files, how to accurately program single parts, and nest parts to maximize material utilization and machining processes. Upon completion of this course, students will be able to draw parts using the TruTops CAD application, work with various macros, nest with TruTops manual and automatic nesters, apply appropriate cutting technologies and logical processing, and generate NC codes suitable for production.

TARGET AUDIENCE

Personnel with programming responsibility

PREREQUISITES

Basic PC skills are a must. Basic blueprint-reading skills are recommended. Fundamental drawing skills using a CAD package and NC programming knowledge are a plus.

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

- Discuss punching concepts and processes
- Identify different types of punching tools and their characteristics
- Identify different file formats: DXF, GEO, GMT, etc
- Identify TruTops Punch interface components and their functions
- Program with the Drawing Application
- Program with the Nesting Application
- Modify tool path and interaction
- Apply proper technology tables/parameters to drawn parts
- Create and apply "macros"
- Create "processing samples"
- Generate Setup Plan, NC code, production plan

COURSE AGENDA

- Overview of punch concepts and theories:
  - cut-to-break ratio
  - machine tonnage and punching force
- Overview of tooling:
  - standard tools, special tools
- Overview of TruTops Punch:
  - system requirements/specification
  - tool bars, menus, buttons, navigation
- Overview of different file formats:
  - DXF, GEO, GMT, TMT, LST
  - import/load, export, convert different files
- Overview of the Drawing Application:
  - interface, menus, tabs, buttons, icons
  - import and prepare DXFs
- Overview of machine options customization:
  - create standard tools, multi-tools, special/forming tools
  - modify machine parameters
- Overview of the Nesting Application:
  - sheet layout strategies: free geometry vs. rectangular nesting
  - create sheet layouts
- Overview of tool path:
  - optimize tooling path
  - modify tooling path
- Application of of "Macros"
- Application of "Processing Samples"
- Application of "Repositioning"
- Application of "Part Removal" techniques
- Overview of processing blanks:
  - slitting, skeleton-free processing possibilities
- Overview of Setup Plan, NC code, production plan

TruTops Tube, TubeDesign, and Programming Tube

Programming

COURSE DESCRIPTION

The TruTops Tube, TubeDesign, and Programming Tube Course is designed to provide students with the essential knowledge and skills to successfully create part programs for TruLaser Tube machines. Students will obtain a working knowledge of how to accurately create, import, export part drawings, program round, square, and rectangular tube parts. Upon completion of this course, students will possess the required skills to program parts by applying technology and logic, edit profiles, and create NC code.

TARGET AUDIENCE

Personnel with programming responsibility

PREREQUISITES

Basic PC skills are a must. Basic blueprint-reading skills are recommended. Fundamental drawing skills using a CAD package and NC programming knowledge are a plus.

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

- Knowledge about laser cutting principles and processes
- Customize the TruTops Tube user interface
- TruTops Tube software programming sequence
- Create tube drawings
- Draw standard intersections in TruTops
- Create .GEO, .ROT, .RPF, .VLG, .RMT, and .LST files
- Create and modify tool path, apply contour approaches, microjoints in TruTops and Programming Tube software
- Apply finished part supports and part removal
- Identify and customize Tube Design interface components
- Create round, square, and rectangular tubes in TruTops and Tube Design
- Edit and identify tube profiles in Tube Design
- Create planes and add dimensions to sketches
- Create extrusions and cuts
- Create patterns and mirrored patterns
- Create multiple tube designs with corners, inserts, and intersections
- Import .TEO files and .TEOX files from Tube Design
- Identify Programming Tube interface components
- Create and modify machine data with with Programming Tube data manager

COURSE AGENDA

- Overview of laser cutting principles and processes
- Discuss TruTops Tube software interface, applications, components and their functions, and sequence
- Review of importing and exporting files
- Overview of {Drawing} Application
  - create round, square, rectangular tubes drawings and use 3D viewer to review drawings
- Discuss file management: manage and save drawings (files)
- Demonstrate and practice how to edit and identify tube profiles
- Demonstrate and practice how to draw standard intersections
- Demonstrate and practice how to create GEO, ROT, RPF, VLG, RMT, and LST
- Overview of {Technology} applications:
  - processing strategies, processing extras
- Discuss how to create and modify tool path
- Demonstrate and practice how to create and modify tool path, apply contour approaches, microjoints in TruTops and Programming Tube software
- Discuss how apply finished part support and part removal
- Overview of TubeDesign software interface, applications, components and their functions
- Demonstrate procedures for creating round, square, and rectangular tubes in TruTops and Tube Design
- Demonstrate and practice how to create extrusions and cuts
- Demonstrate and practice how to create patterns and mirrored patterns
- Discuss plane processing techniques for special cuts and geometries
- Review how to create multiple tube designs with corners, intersections, and inserts
- Demonstrate how to import .TEO and .TEOX files from Tube Design
- Discuss how to generate and transfer NC Code
- Overview of Programming Tube interface components
- Demonstrate and practice how to create and modify machine data with with Programming Tube data manager

TruTops Boost Bend

Programming

COURSE DESCRIPTION

The TruTops Boost Bend Programming Course is designed for all TRUMPF TruBend machines. This course is designed to provide students with the knowledge and skills to successfully create part programs for production. Students will obtain a working knowledge of how to import files, accurately program bending parts, determine the correct tool combination, optimize bending sequence, and generate NC codes suitable for production.

TARGET AUDIENCE

Personnel with programming responsibility

PREREQUISITES

TruTops Boost HomeZone

COURSE DURATION

3 days

LEARNING OBJECTIVES

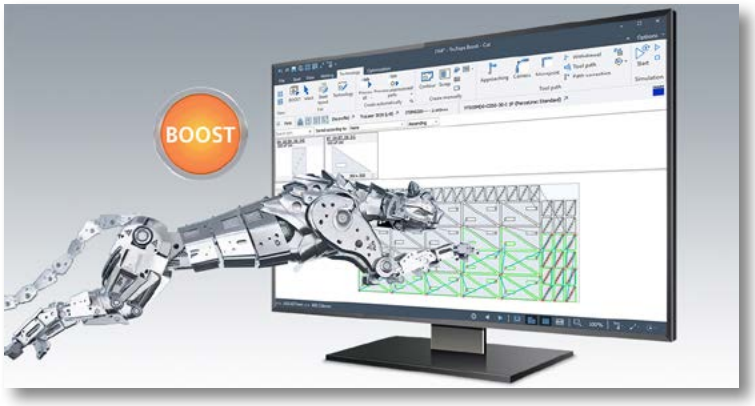
- Discuss bending principle and types of bending
- Discuss tooling specifications, functionalities, and applications
- Identify various part file formats
- Identify TruBend machines components, controls, and axes
- Apply automatic processings
- Modify bend sequence, tooling Setup Plan, and bending process manually
- Discuss ACB theory and applications
- Customize settings, configurations, and data menus
- Manage tool inventory
- Create custom tool list
- Create custom tools
- Create a functionally accurate NC program
- Create a functionally accurate Setup Plan

COURSE AGENDA

- Overview of bending concepts, theory, and methods
- Overview of tooling specifications and applications
- Overview of machine axes:
  - all machine axes and backgauge axes
  - individual axis processing capabilities
- Overview of TruTops Boost Bend interface:
  - tool bars, menus, buttons, navigation
- Discuss various file formats:
  - DXF, GEO, SCDOC, SLDPRT
  - import/load, export, convert different file formats
- Demonstrate and practice how to apply automatic processings
- Demonstrate and practice how to apply manual modifications:
  - bend sequence
  - tooling sequence
  - bending process
- Overview of machine parameters and pre-settings
- Discuss how to generate a customized tool list
- Demonstrate and practice how to create a custom tool:
  - produce segmented tools to use as a default tool
- Overview of ACB:
  - characteristics and function of the ACB
  - apply ACB to automatically correct bend angles
- Discuss various program results:
  - create Setup Plans
  - generate NC code
  - create a production plan

TruTops Boost Laser

Programming



COURSE DESCRIPTION

The TruTops Boost Laser Programming Course is designed to provide students with the essential knowledge and skills to successfully create part programs for production. Students will obtain a working knowledge of how to accurately import drawing files, nest parts to maximize material utilization and machining processes. Upon completion of this course, students will be able to create nesting profiles, apply manual and/or automatic nesters, apply appropriate cutting technologies and logical processing, and generate NC codes suitable for production.

TARGET AUDIENCE

Personnel with programming responsibility

PREREQUISITES

TruTops Boost HomeZone

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

- Discuss basic laser theory and applications
- Discuss various types of laser cutting and machine parameters/ specifications
- Identify TruTops Boost Interface components and state their functions.
- Configure a TruLaser machine
- Import various program file types
- Utilize automatic Boost button features for the Part and Job Categories.
- Create a new raw material sheet and size
- Create a sheet job and an automatic or manual layout of parts
- Create processing for single and multiple sheet layouts
- Modify automatic Boost parameters
- Apply various laser processing options (Piercing, Approach, etc.)
- Read and modify Contour types/sizes
- Select and modify Laser technology tables. and processing rules
- Activate and modify and MicroJoints, MicroWelds, and contour scrap cuts
- Create manual and automatic sheet cuts and utilize remainder sheets
- Apply common-line cutting (TwinLine) options
- Create a Production Plan

COURSE AGENDA

- Overview of laser cutting concepts and processes
- Overview various types of laser cutting and machine parameters
- Overview of TruTops Boost Laser interface components:
  - tool bars, menus, buttons, navigation
- Discuss various file formats:
  - DXF, GEO, SCDOC, SLDPRT
  - import/load, export, convert different file formats
- Discuss how to configure a machine
- Demonstrate and practice how to utilize automatic Boost button feature
- Overview of nesting functions:
  - create a nesting job
  - apply free geometry layout
- Review of creating processings:
  - for single and sectional sheet layout
- Discuss how to preset automatic boost parameters
- Demonstrate different ways to apply processing options
- Discuss how to modify contour sizes
- Demonstrate and practice how to apply common line cutting technique
- Overview of tech tables: select and modify
- Overview of working with rules: create and select various rules
- Demonstrate how to to activate the MicroWeld and MicroJoint functions
- Demonstrate how to to utilize scraps/remainder of the sheet/ workpiece
- Discuss material management: create a raw material sheet and size
- Demonstrate and practice how to create a production plan

TruTops Boost Punch

Programming

COURSE DESCRIPTION

The TruTops Punch Programming Course is designed to provide students with the essential knowledge and skills to successfully create part programs for production. Students will obtain a working knowledge of how to import drawing files, how to accurately program single parts, and nest parts to maximize material utilization and machining processes. Upon completion of this course, students will be able to work with various macros, nest with TruTops manual and automatic nesters, apply appropriate cutting technologies and logical processing, and generate NC codes suitable for production.

TARGET AUDIENCE

Personnel with programming responsibility

PREREQUISITES

TruTops Boost HomeZone

COURSE DURATION

4.5 days

LEARNING OBJECTIVES

- Discuss punching concepts and processes
- Identify different types of punching tools and their characteristics
- Identify TruTops Boost Punch interface components and their functions
- Import different file formats
- Modify material and sheet thickness
- Apply the Nesting function
- Apply manual and automatic processings
- Modify tool paths and interactions
- Program oversized sheets with "Repositioning"
- Apply proper technology parameters to drawn parts
- Create and apply "Processing samples"
- Apply and modify "Macros"
- Apply program options, e.g., tapping and roller tools
- Create part orders and apply the automatic "BOOST" function
- Generate Setup Plan, NC code, production plan and release programs

COURSE AGENDA

- Overview of punching concepts and theories:
  - cut-to-break ratio
  - machine tonnage and punching force
- Discuss tooling:
  - standard tools, special tools
- Overview of TruTops Boost Punch interface:
  - tool bars, menus, buttons, navigation
- Overview of various file formats:
  - DXF, GEO, SCDOC, SLDPRT
  - import/load, export, convert different file formats
- Discuss how to configure a machine
- Demonstrate and practice how to utilize the automatic Boost button feature
- Overview of nesting functions:
  - create sheet layout
  - apply compulsory sequences
- Discuss different techniques for working with tool path:
  - optimize tool path
  - modify tool path
- Overivew of "macros": apply and modify "macros"
- Demonstrate and practice working with "processing samples"
- Demonstrate and practice how to apply common line cutting technique
- Demonstrate and practice working with "repositioning"
- Discuss different "part removal" options
- Overview of processing blanks:
  - slitting, skeleton-free processing possibilities
- Discuss various program results:
  - create Setup Plans, generate NC code, create production plan
- Overview of machine options customization:
  - create standard tools, multi-tools, special/forming tools
  - modify machine parameters

TruTops Boost Design

Programming

COURSE DESCRIPTION

The synchronous TruTops Boost Design Programming elearning Course is designed for customers who wish to learn Boost Design without having to travel to TRUMPF. The goal of the course is to provide students with the core knowledge and skills to successfully draw 2D or 3D parts. Students will learn a variety of drawing techniques, e.g., "shell" or "pull," how to generate and modify sheet drawings, and how to troubleshoot corrupt drawing files. The students will be given several projects that will allow them to practice various techniques they have just learned.

TARGET AUDIENCE

Personnel with programming responsibility

PREREQUISITES

TruTops Boost TechZone (one of the Boost Laser, Punch, or Bend classes) and a valid TruTops Boost license. Dual-monitor workstation is highly recommended.

COURSE DURATION

12 hours (4 hours per day, Tuesday through Thursday) plus extra hours each day for projects and homework assignments

LEARNING OBJECTIVES

- Identify icons and buttons on the Boost Design user interface
- Navigate through different menus
- Use mouse gestures for various operations
- Draw 2D (flat) parts with various techniques
- Draw 3D parts with various techniques
- bending concept, options, and bend deductions
- Edit/modfiy designs
- Create sheet drawings
- Identify and dissolve sheet assemblies
- Troubleshoot corrupt drawing files with various repair techniques

COURSE AGENDA

- Overview of Boost Design interface:
  - icons, elements, and menus
- Discuss 2D design concepts and essentials
- Overview of 2D drawing techniques:
  - draw E-plate with "rectangle" and "line" techniques
  - draw L-plate with "pull" technique
  - draw sickle plate with "sweep arc" technique
  - draw rotational geometrical parts with "mirror" technique
  - draw parts with "pattern" technique
- Demonstrate and practice how to edit/modify 2D drawings:
  - modify 2D parts with "pull" and "move" techniques
- Discuss 3D design concepts and essentials
- Overview of 3D drawing techniques:
  - draw 3D parts with "pull" and "shell" techniques
  - draw 3D parts with "bend" technique
- Demonstrate and practice how to create sheet drawings:
  - add a new sheet drawing to a design
  - add, remove, and edit part views
  - add dimensions, notes, barcodes and other info
- Discuss how to manage assemblies in the HomeZone:
  - import the assembly (HomeZone)
  - identify assembly components as sheet metal parts
  - dissolve assemblies and exit TechZone Design
- Demonstrate and practice how to troubleshoot corrupted geometries:
  - discuss functions under the "Repair" and "Prepare" tabs
  - delete unnecessary solids and create new solids
  - split drawings with "split body" and then combine/merge solids

Additional

SheetMetal Design

COURSE DESCRIPTION

The Sheet Metal Design Course is intended for engineers, designers, and programmers involved in the designing and/or machining process of their sheet metal parts who would like to rethink the entire design process. In this course, students will learn how to streamline the design process and make full use of sheet metal knowledge to design better parts and replace and/or make improvements on current manufacturing processes in a faster and cost-efficient manner.

TARGET AUDIENCE

Engineers, designers, and programmers

PREREQUISITES

An interest in learning the latest sheet metal design methodologies and techniques to streamline the design processes. Basic knowledge of CAD/CAM systems. Past design experience is a plus.

COURSE DURATION

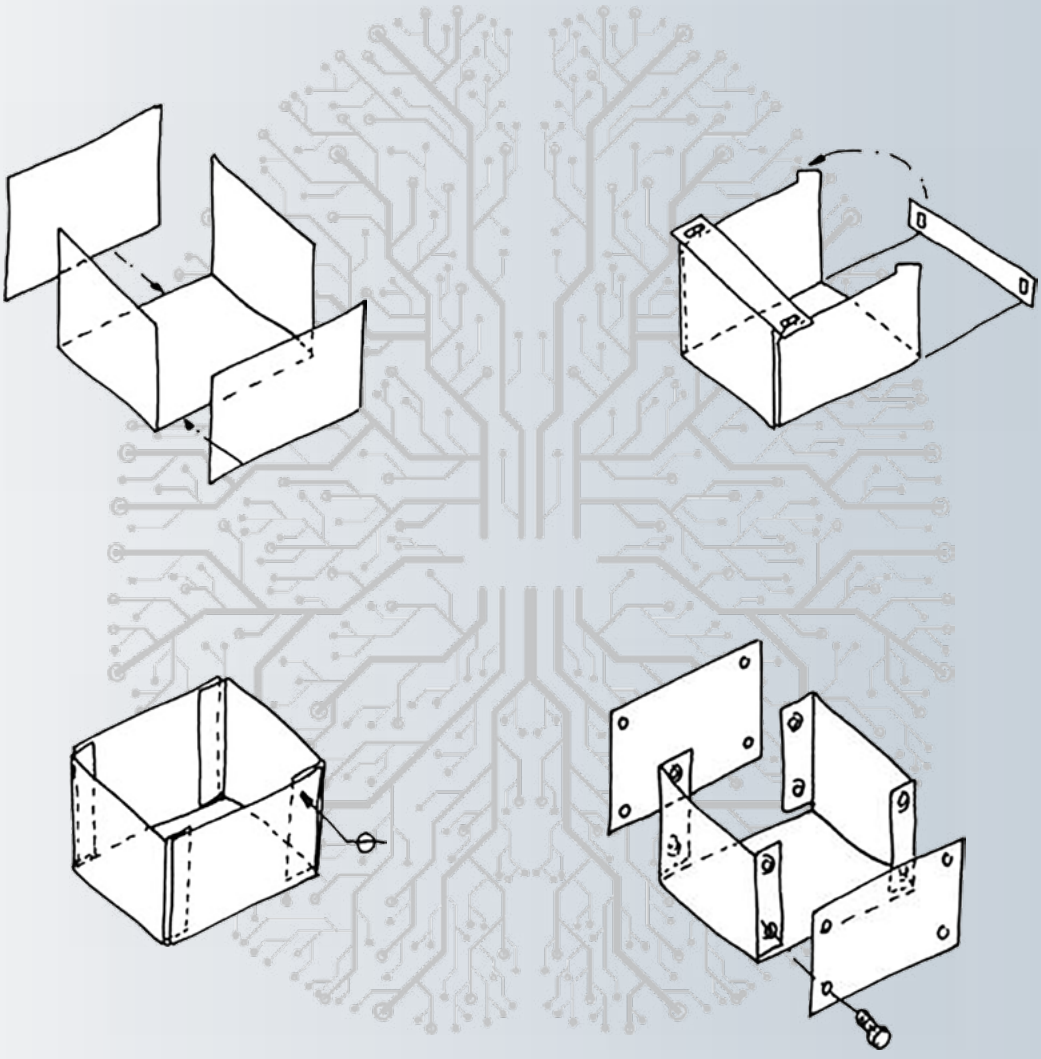
3 days

LEARNING OBJECTIVES

- Overview of traditional design methodologies and explore new design options
- Discuss various techniques, methodologies, options, and considerations when designing sheet metal parts
- Identify ways to avoid design mistakes or design flaws
- Discuss techniques and possible solutions for a successful design of a flat pattern
- Demonstrate step-by-step design process from an idea to a finished product
- Overview of the design process chain
- Discuss methods to streamline the design process
- Practice designing various sheet metal parts by applying appropriate techniques and ideas
- Discuss latest manufacturing technologies

COURSE AGENDA

- Overview of old design methodologies and common design issues
- Discuss different ways to avoid design mistakes or flaws
- Overview of ideas, techniques, and solutions for designing better sheet metal parts:
  - avoid stress points
  - determine force path
  - increase stiffness and stability
  - reduce parts in weldment
  - reduce distortion
  - determine appropriate welding seam positions
  - reduce grinding
  - use positioning aids: pins, tabs, markings, etc.
  - integrate multiple parts
  - prepare radius and corners
  - create bendable profiles
- Overview of techniques to create a flat pattern
- Demonstration of step-by-step design process
- Hands-on workshop practice:
  - apply newly learned design knowledge and techniques to optimize the designs of various parts
- Review of latest manufacturing technologies:
  - TRUMPF laser cutting technology
  - TRUMPF punching technology
  - TRUMPF bending technology
- Overview of the design process chain:
  - discuss methods to streamline the design process
- Discuss options to optimize sheet metal process:
  - cost considerations
  - time
  - weight optimization
  - production optimization
  - reduce or eliminate fixturing
  - functionality
  - design considerations for sheet metal parts
- Customer parts are welcome as class examples to be re-designed



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