TITANS OF CNC

APPRENTICESHIP GUIDE



ONE ACADEMY. FOUR DISCIPLINES.

CNC MACHINING • AEROSPACE • GRINDING • SWISS MACHINING

800K+ STUDENTS | **100%** FREE

2026 EDITION

THE COMPLETE APPRENTICESHIP GUIDE

YOUR PATH. PAGE BY PAGE.

Explore the Academy. Build the skills. Create your own program.

01 **THE APPRENTICESHIP GUIDE**
One Academy. Four disciplines. A foundation for your workforce.

02 **YOUR GUIDE, PAGE BY PAGE**
A complete map of the Academy, the curriculum and your program.

03 **A MESSAGE FROM TITAN GILROY**
The founder’s story, mission and commitment to free CNC education.

04 **WHY THIS GUIDE EXISTS**
A clear roadmap for building your own company-specific apprenticeship.

05 **THE TITANS METHOD**
Design it. Program it. Machine it. Inspect it. Repeat.

06 **THE PATH TO CNC MASTERY**
Build real experience through repetition and progressively harder parts.

07 **ONE NETWORK. EVERY LEVEL OF CNC.**
Explore four disciplines, MFG Connect and the global media network.

08 **THE MILLING PATH**
Progress from Building Blocks to fixturing, five-axis and aerospace.

09 **THE LATHE PATH**
Advance through the Rocket, Chess Series and aerospace connections.

10 **BUILDING BLOCKS: TITAN-1M–5M**
Establish the foundation through five increasingly demanding projects.

11 **BUILDING BLOCKS: TITAN-6M–10M**
Develop advanced features, toolpaths and aerospace-level complexity.

12 **PROOF OF SKILL, NOT JUST A RESUME**
Show completed parts, documented work and the full learning system.

13 **YOU BUILT THE PART. NOW PROVE IT.**
Measure, record and verify the TITAN-10M final inspection report.

14 **ONE PART. THREE PROVEN SKILLS.**
Earn separate CAD, CAM and CNC credentials through verified work.

15 **MFG CONNECT: SHOW YOUR SKILLS**
Bring your certifications and portfolio together in one shareable profile.

16 **MFG CONNECT: BUILD YOUR FUTURE**
Find employment, customers and your manufacturing community.

17 **BUILD THE WORKFORCE YOUR COMPANY NEEDS**
Turn shop knowledge into a training foundation and a lasting company asset.

18 **HOW TO BUILD YOUR PROGRAM: STEPS 1–3**
Set the curriculum path, choose mentors and reserve training resources.

19 **HOW TO BUILD YOUR PROGRAM: STEPS 4–6**
Set safety rules, agree on the plan and repeat the project learning cycle.

20 **HOW TO BUILD YOUR PROGRAM: STEPS 7–8**
Verify skills, earn certification and keep improving your program.

FROM THE SHOP FLOOR

A MESSAGE FROM TITAN GILROY

TITANS of CNC was founded in 2005 — not as a media company, but as a working CNC shop. That shop has since machined parts for aerospace, medical, and subsea industries, and it became the foundation for something bigger: a belief that the fastest way to close the manufacturing skills gap is to simply teach people everything, without gatekeeping.

Since then, over 800,000 students have trained with the Academy, and the TITANS of CNC message has reached millions more across our media channels. But growth exposed a gap of our own: we built an enormous library of CAD tutorials, CAM tutorials, CNC operation videos, prints, setup sheets, inspection documents, and 3D models — and we never handed anyone a map.

> *"Give a student easy tasks and they will learn easy tasks. Give them the full, correct knowledge and they will rise to meet it."*
>
> TITAN GILROY

Our philosophy is simple: real speeds and feeds, real tooling, real depths of cut, real setup sheets. It is rarely the student who sets the ceiling — it's the instructor. This Playbook exists to remove that ceiling, for a single self-taught machinist and for a full classroom alike.

ONE ACADEMY. FOUR DISCIPLINES.

800K+	4	100%	GLOBAL IMPACT
ACADEMY STUDENTS	DISCIPLINES	FREE CURRICULUM	MILLIONS REACHED



CNC MACHINING DISCIPLINE

Mill, Drill, Tap. Master the core skills, from first chips to complex multi-axis parts.



AEROSPACE DISCIPLINE

Advanced materials. Tight tolerances. Mission-critical parts built to spec.



GRINDING DISCIPLINE

The world's most advanced CNC grinding training. Cylindrical, surface, creep-feed, and more.



SWISS MACHINING DISCIPLINE

Small parts. Big precision. Swiss-type machining from setup to production.

A NOTE ON THIS EDITION

This Playbook is provided in **digital form** and should be given to **every student, machinist, and instructor.** As a collective, we all benefit when everyone understands how the Academy works and how an apprenticeship program should be properly **designed, created, and administered.**

CHAPTER 1

WHY THIS GUIDE EXISTS

800,000+ STUDENTS. ONE ACADEMY. FOUR DISCIPLINES.

With more than 800,000 students, TITANS of CNC has grown into the world's largest industrial education platform. Across four disciplines — CNC Machining, Aerospace, Grinding and Swiss Machining — we have built an immense library of real-world manufacturing knowledge: curriculum, prints, setup sheets, inspection documents, process documents, CAD/CAM resources, fundamentals, full-part tutorials and step-by-step machine training.

That scale creates a new challenge: with this much manufacturing knowledge, schools and companies need a clear structure that turns incredible resources into a repeatable apprenticeship program built around the work they actually do.

That is why we created this guide. It is a step-by-step roadmap for schools and companies to build their own apprenticeship program and tailor it to their machines, processes, materials and the actual parts they manufacture. TITANS training spans CAD, CAM and CNC — from fundamentals through programming, setup, tooling, machining, finished part and inspection — with training that also develops leadership.

Our approach is built around guided execution. Step-by-step video instruction and proven processes develop the exact high-level skills needed to perform as an operator, setup machinist, programmer, machinist or leader — while avoiding common mistakes and building correctly from the start.

800K+
ACADEMY STUDENTS

4
DISCIPLINES

100%
FREE CURRICULUM

ONE
CLEAR ROADMAP

OUR MISSION

Give every school and company a clear blueprint to build a high-level apprenticeship around the work they actually do — using the TITANS of CNC Academy to develop operators, setup machinists, programmers, machinists and leaders.

WHAT THIS GUIDE GIVES YOU

- A MAP OF THE ACADEMY
- STEP-BY-STEP PROGRAM PATHS
- CAD • CAM • CNC • INSPECTION
- A BLUEPRINT FOR APPRENTICESHIP

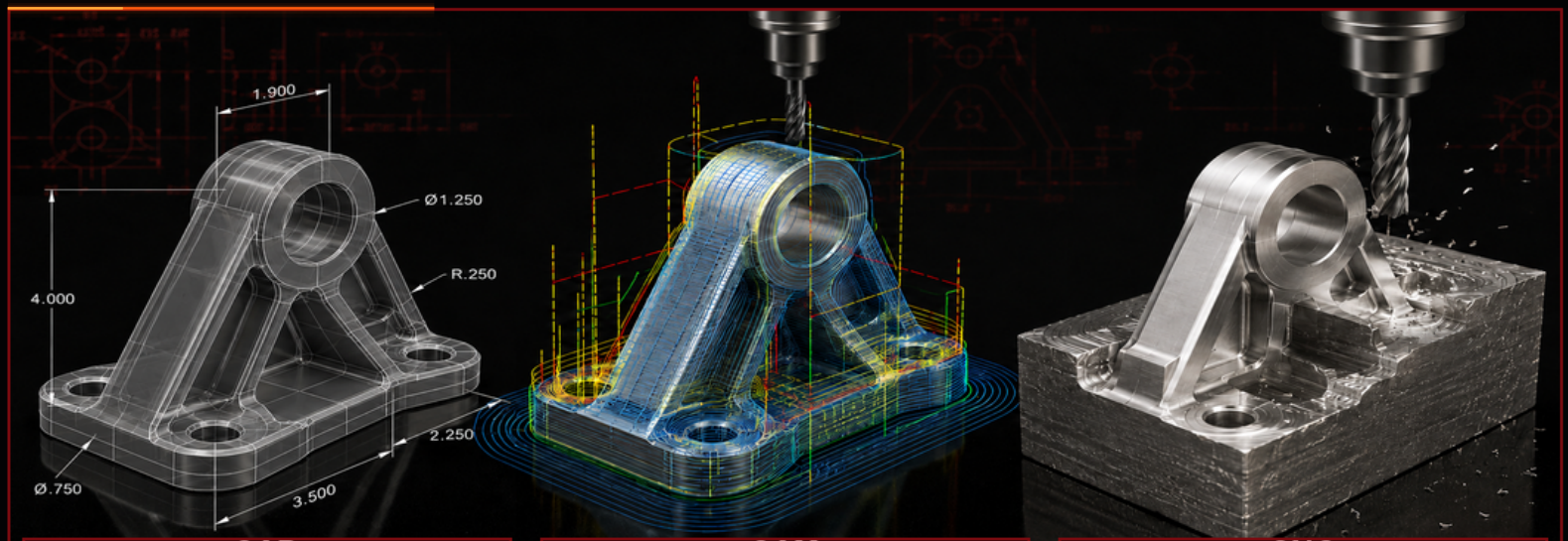
KNOW THE PATH. BUILD THE SKILL. MASTER THE CRAFT.

THE TITANS METHOD

WE FLIPPED CNC EDUCATION ON ITS HEAD.

FROM PRINT TO PART IN DAYS - THEN MASTERY THROUGH REPETITION.

Traditional programs can delay CNC for years. We start students in the complete CNC process immediately: design the part, program it, machine it, inspect it - then repeat the process with progressively harder parts.



CAD	CAM	CNC
DESIGN FROM THE PRINT	PROGRAM + SIMULATE	SET UP MACHINE + INSPECT

THE COMPLETE CNC PROCESS

01 CAD

Start with a real print and build the solid model yourself. Creating every feature and dimension makes you know the part intimately - and understand exactly what the finished part must become.

02 CAM

Bring your model into Mastercam. Learn five core tools first - face mill, end mill, drill, tap and chamfer - plus speeds, feeds, toolpaths, simulation and post-processing.

03 CNC

Follow the setup checklist: prep and indicate the vise, load tools, set offsets, dry run safely, machine the real part, then inspect it against the print. Inspection proves the complete CNC process and the precision of the finished part.

04 REPEAT

REPETITION IS THE ACCELERATOR.

Titan 1M becomes Titan 2M, Titan 3M and beyond. The core process stays familiar while every project adds new tools, strategies and complexity - so students build skill through hundreds of real parts, not a handful.

BUILDING BLOCKS > ROCKET > FIXTURING > 5-AXIS > AEROSPACE > SWISS

CNC IN DAYS. MASTERY THROUGH HUNDREDS OF PARTS.

DESIGN IT. PROGRAM IT. MACHINE IT. INSPECT IT. REPEAT.

TITAN GILROY'S CNC EDUCATION PHILOSOPHY

THE FASTEST, MOST EFFICIENT PATH TO CNC MASTERY.

THE FASTEST PATH TO MASTERY IS NOT MORE THEORY. IT IS MORE CORRECT EXPERIENCE.

For generations, machining education has followed the same basic idea: spend years learning fundamentals first, often on manual machines, and earn your way to CNC later. I respect the fundamentals. I built my life in this trade. But I fundamentally disagree with making CNC the reward at the end of a long road. If a student wants a career in modern manufacturing, CNC is not the finish line. It is the language of the industry. I want them speaking that language immediately.

That is why we built TITANS of CNC differently. We start with a real print and a real part. The student opens CAD and creates the model from the print - sketching the geometry, defining the dimensions, building the thickness and features until the solid model is theirs. That first step changes everything. They are not being handed a shape they do not understand. They created it. They know where every wall, hole, pocket and feature came from. Before a cutter ever touches metal, the student already knows what the finished part is supposed to become.

Then we move straight into CAM. A beginner does not need to be buried under a million tools, strategies and choices they have no context for. On an early Building Block, we may need only five tools: a face mill, an end mill, a chamfer tool, a drill and a tap. So those are the tools we teach. We show the student how to build them in the CAM system, how each one works, and how to apply the speeds, feeds, radial engagement, axial depth and toolpaths to the model they just created. They watch the process. They program the part. They simulate it from every angle. They post the program into G-code. The mystery disappears because every lesson is attached to an actual decision they must make right now.

From there we go to the CNC machine. The setup sheet and checklist walk them through the complete setup: prepare the table, stone the surfaces, set and indicate the vise, load the tools, establish offsets, verify the program and dry run it safely above the part. If they reach a step they do not understand, the lesson for that exact skill is there when they need it. Then they machine the part and inspect it. CAD, CAM and CNC are not three disconnected subjects. They are one continuous process - from an idea on a print to a verified part in your hand.

Some people look at this method and say, 'Titan, you are just telling them exactly what to do.' Absolutely. At first, that is the point.

When someone is new, confusion is not education. I give them a proven process so they can build correct experience before bad habits have a chance to take root. Then something powerful happens. Repetition takes over.

By the third or fourth part, the student begins to see the pattern before we explain it. They know the large face mill will establish the top. They know material must be roughed away, walls and features finished, edges chamfered, holes drilled and tapped, and the completed work inspected. They start reaching for the next operation before the video tells them what it is. The familiar work becomes instinct, which frees their mind to focus on what is new - a key cutter, an engraver, a different tap, a new workholding strategy, 3D surfacing, another setup or a harder material. They stop copying a process and start understanding why the process works.

That is the breakthrough: at first they follow the process. Then they recognize the process. Then they predict the process. Finally, they own the process. We are not creating students who can follow one video. We are deliberately creating independent machinists by compressing hundreds of correct decisions into their training through repetition.

And we keep raising the level. The Building Blocks become more complex. The Rocket Series advances the challenge. Fixturing changes how they think about holding and producing parts. Five-axis forces them to see geometry, access and motion differently. Then we move into advanced aerospace, medical, Swiss and mill-turn work. Even a familiar Building Block can become a new lesson when it is cut in steel, titanium or Inconel, because the geometry may be familiar while the material changes the strategy, tooling and cutting conditions. The foundation stays alive while the difficulty climbs.

This is the TITANS philosophy. Do not make people wait years to touch the technology that will define their career. Put them inside the entire process now. Give them the right information at the exact moment it has meaning. Let them design it, program it, simulate it, machine it and inspect it. Then do it again. And again. And again - each time with greater complexity. Repetition turns instruction into recognition. Recognition becomes judgment. Judgment becomes confidence. Confidence becomes mastery. That is how we build CNC machinists for the real world.

AT FIRST, FOLLOW THE PROCESS. THEN RECOGNIZE IT. THEN OWN IT.

REPETITION TURNS INSTRUCTION INTO INSTINCT.

THE WORLD'S LARGEST CNC MACHINING + MANUFACTURING EDUCATION PLATFORM

ONE NETWORK.
EVERY LEVEL OF CNC.

TITANS of CNC unites free education, real-world projects, certification, community and the world's most powerful CNC media network - giving every apprentice a path from first print to advanced manufacturing.

ONE ACADEMY. FOUR DISCIPLINES.

01 CNC MACHINING DISCIPLINE

FOUNDATIONS TO 5-AXIS

CAD, CAM and CNC through Building Blocks, Rocket, fixturing, tutorials, tooling, 3+2 and simultaneous 5-axis.

02 AEROSPACE DISCIPLINE

PRODUCTION-LEVEL COMPLEXITY

Aerospace Connections, precision fittings, advanced workholding, tight tolerances and difficult materials including titanium and Inconel.

03 GRINDING DISCIPLINE

PRECISION BEYOND THE CUT

Surface, cylindrical and advanced grinding knowledge that teaches finish, geometry, process control and micron-level accuracy.

04 SWISS MACHINING DISCIPLINE

HIGH-PRECISION PRODUCTION

Swiss programming, setup, tooling and production methods for complex aerospace, defense, electronics and medical components.

THE POWER BEHIND THE CURRICULUM

MFG CONNECT

THE WORLD'S MANUFACTURING COMMUNITY

A purpose-built professional network where machinists learn, earn certifications, showcase work, build a digital resume and connect directly with employers and industry leaders.

EXPLORE | CERTIFY | CONNECT | GET HIRED

MFGCONNECT.COM

GLOBAL MEDIA ENGINE

THE ACADEMY TEACHES. THE NETWORK AMPLIFIES.

Thousands of videos and the largest aggregate reach in CNC carry advanced manufacturing into schools, shops and homes around the world.

6M+ COMBINED COMMUNITY
BILLIONS OF VIEWS | 190+ COUNTRIES

ONE PATH. LIMITLESS DEPTH.

START WITH THE FUNDAMENTALS. ADVANCE WITHOUT A CEILING.

FOUNDATIONS	CORE BUILD	SPECIALIZE	ADVANCE	PROVE IT
Prints + CAD/CAM	Blocks + Rocket	Fixture + 5-Axis	Aero + Swiss + Grind	Inspect + Certify

THE ACADEMY IS THE CURRICULUM. THE NETWORK IS THE FORCE MULTIPLIER.

LEARN IT. BUILD IT. PROVE IT. SHARE IT. RISE.

THE MILLING PATH / BUILD TOWARD MASTERY

LEVELS OF CNC MACHINING

"THERE ARE LEVELS TO THE GAME." - TITAN GILROY

Start with milling. Each series raises your skills, your judgment and what you can make.

LEVEL 01

BUILDING BLOCKS

BUILD THE FOUNDATION

TITAN-1M through TITAN-10M teaches the complete CAD-to-CNC process. Model, program, set up, machine and inspect. Learn to make the part correctly, then repeat it with confidence.



TITAN-1M | TITAN-2M | TITAN-3M

LEVEL 02

THE ART OF FIXTURING

THINK BEYOND THE VISE

Move from holding two parts toward 30 or 60 per load when the job allows. Build fixture plates and complex workholding with different clamp types. Locate, support and repeat accurately so the machine can cut longer between door openings.



THE COMPLETE FIXTURING SETUP

LEVEL 03

FIVE-AXIS SERIES

RAISE THE COMPLEXITY

Start with the square. Learn five-axis setup, machine orientation and how to reach each face. Then progress into sculpted parts and increasingly complex toolpaths, building the control and confidence required for advanced five-axis machining.

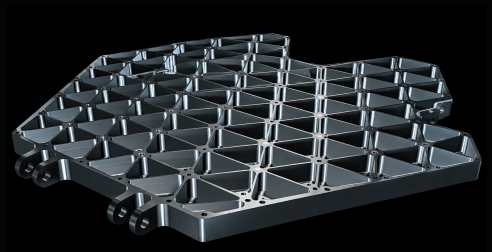


LEVEL 04

AEROSPACE DISCIPLINE

BRING IT ALL TOGETHER

Apply advanced process strategy to the TITAN-513M ISOGRID. Bring complex geometry, custom fixtures, machining and documented inspection together.



TITAN-513M / ISOGRID

EARN THE NEXT LEVEL: COMPLETE THE WORK. VERIFY THE PART. GET MENTOR SIGN-OFF.

THE LATHE PATH / BUILD TOWARD MASTERY

LEVELS OF CNC MACHINING

"MACHINING IS ALL ABOUT LEVELS." - TITAN GILROY

Start with turning. Build the skills to take on increasingly demanding parts.

LEVEL 01

THE TITAN ROCKET

MASTER TWO-AXIS TURNING

Machine ten unique parts with different profiles, bores, internal grooves and threads. They thread together into one complete rocket. Learn the two-axis lathe process: model, program, set up, turn, inspect and prove the fit.



10 UNIQUE PARTS. ONE COMPLETE ROCKET.

LEVEL 02

TITAN CHESS SERIES

ADD LIVE TOOLING

Move to a lathe with live tooling. TITANS-designed chess pieces combine solid bases with intricate features, using just three live tools. Coordinate turning, milling and drilling to build the skills for complex finished parts.



SIX CHESS DESIGNS. THREE LIVE TOOLS.

LEVEL 03

AEROSPACE CONNECTIONS

CONTROL EVERY DETAIL

Advance through complex aerospace connections in 316/316L stainless. Machine intricate threads and wire holes. Control tool wear, finish and tight tolerances through precise setups and inspection.



FIVE AEROSPACE CONNECTION DESIGNS

LEVEL 04

AEROSPACE DISCIPLINE

MASTER DEMANDING MATERIALS

Take on titanium and Inconel 625. Study speeds, feeds, depths of cut and live-tool paths. Match horsepower, torque and workholding to the cut. Verify critical features.



TITAN-512L

TITAN-509LM

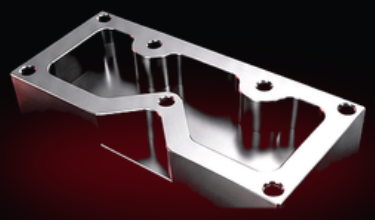
EARN THE NEXT LEVEL: COMPLETE THE WORK. VERIFY THE PART. GET MENTOR SIGN-OFF.

THE TITANS CNC MACHINING FOUNDATION SERIES

BUILDING BLOCKS

TEN PARTS. ONE ENGINEERED PATH TO CNC MASTERY.

All ten parts begin as affordable 1 x 2 aluminum bar stock. Just 43 inches completes the series. Every project repeats the full CAD-CAM-CNC process while adding one deliberate new challenge.



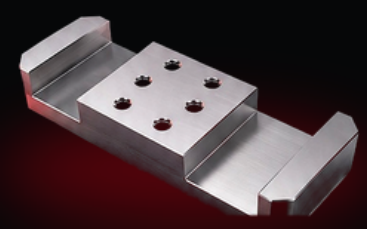
TITAN-1M — THE FOUNDATION

PART + FEATURES

A real component with internal pockets, sculpted side contours and 10-32 threaded holes - all created from the same 1 x 2 aluminum stock used throughout the series.

NEW SKILLS + TOOLS

The student completes the entire cycle for the first time: read the print, build the CAD model, program face mill/end mill/chamfer/drill/tap operations, set up both sides, machine, deburr and inspect.



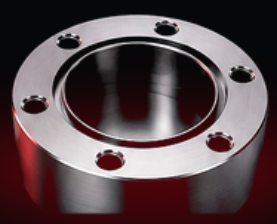
TITAN-2M — OPEN GEOMETRY

PART + FEATURES

The part grows longer and replaces closed internal pockets with open-ended pockets, rounded transitions and larger 1/4-20 threads. The cutter can no longer simply follow one enclosed perimeter.

NEW SKILLS + TOOLS

The student must approach the open geometry from different directions, control tool entry and exit, and build separate finish passes that leave every exposed wall and corner clean.



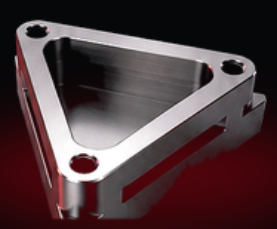
TITAN-3M — ROUND WORKHOLDING

PART + FEATURES

The first round component adds a deep center pocket and a functional O-ring groove where finish quality matters. Operation two can no longer be held reliably in standard vise jaws.

NEW SKILLS + TOOLS

The student designs and machines soft jaws, develops a secure second-operation setup, ramps into the pocket and uses a controlled groove-finishing technique that eliminates witness lines.



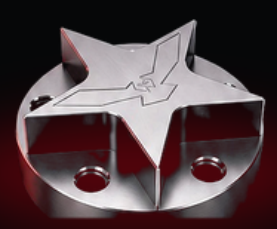
TITAN-4M — SPECIALTY CUTTING

PART + FEATURES

A triangular profile introduces a precision internal pocket, 10-32 threads and three recessed side radii that cannot be reached with a standard end mill from above.

NEW SKILLS + TOOLS

A key cutter is added to the tool library. The student positions it below the top surface, controls side engagement and machines the same radius consistently into all three sides.



TITAN-5M — DEPTH + ENGRAVING

PART + FEATURES

A circular base supports a raised star, recessed floors, threaded holes beginning roughly 3/8 inch below the top and the detailed TITANS eagle machined into the star.

NEW SKILLS + TOOLS

The student manages multiple Z levels, starts drilling and tapping below a recessed surface, imports the eagle template and adds precision engraving without damaging the surrounding finished geometry.

THE PROCESS STAYS FAMILIAR. THE COMPLEXITY NEVER STOPS RISING.

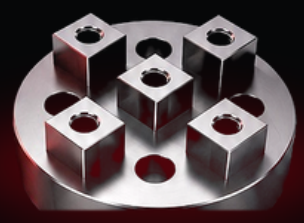
FACE | MILL | CHAMFER | DRILL | TAP | INSPECT | REPEAT

THE ENGINEERED PROGRESSION CONTINUES

BUILDING BLOCKS

FROM ADVANCED FEATURES TO AEROSPACE MASTERY.

Parts 6M through 10M force the student to retrieve and combine earlier skills. Islands become mirroring, internal grooves, 3D surfacing and finally a tapered aerospace isogrid.



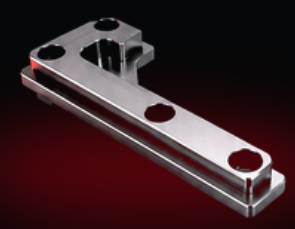
TITAN-6M — RAISED ISLANDS

PART + FEATURES

Another round component now contains multiple small square islands that must remain standing while the surrounding material is cleared. Each island contains its own threaded feature.

NEW SKILLS + TOOLS

Instead of machining one open floor, the student protects delicate geometry, plans efficient material removal around obstacles and finishes tight transitions without clipping an island or leaving excess stock.



TITAN-7M — MIRRORED GEOMETRY

PART + FEATURES

This long bracket is machined on both faces. When the part is flipped, the second side must mirror the first so the outer profile, holes, step and internal features align perfectly.

NEW SKILLS + TOOLS

The student mirrors geometry and toolpaths, controls orientation during the flip, establishes a repeatable second-operation location and proves that matching features can be held from side to side.



TITAN-8M — INTERNAL GROOVES

PART + FEATURES

The binocular-shaped component adds two precision circular bores joined by a flowing center profile. Internal grooves are machined inside both bores below the top surface.

NEW SKILLS + TOOLS

The key cutter returns in a more demanding application. The student controls bore diameter, circular interpolation, groove depth and tool clearance while maintaining symmetry between two matching features.



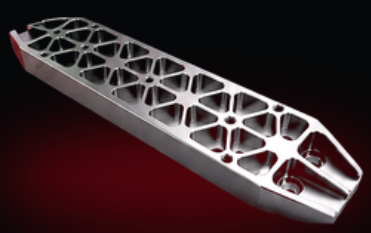
TITAN-9M — 3D SURFACING

PART + FEATURES

The first true advanced 3D component replaces simple 2D walls and floors with a continuous sculpted contour. Surface quality must remain consistent as the cutter moves across changing geometry.

NEW SKILLS + TOOLS

Three separate finishing strategies are taught and compared. The student learns step-over control, surface direction and how to produce a flawless 3D finish - the exact capability required for 10M.



TITAN-10M — AEROSPACE ISOGRID

PART + FEATURES

The final part is a tapered aerospace structural component. Its isogrid web removes weight while preserving strength, and the opposite side adds islands, threads and detailed secondary geometry.

NEW SKILLS + TOOLS

The student must retrieve the 9M surfacing method independently; it is no longer retaught. Every earlier skill converges here: workholding, taper, web machining, pockets, islands, drilling, threading, finishing and inspection.

BY 10M, REPETITION HAS BECOME INDEPENDENT CAPABILITY.

DESIGN IT. PROGRAM IT. MACHINE IT. INSPECT IT. OWN IT.

THE COMPLETE BUILDING BLOCKS LEARNING SYSTEM

PROOF OF SKILL- NOT JUST A RESUME.

A resume tells an employer where someone worked and for how long. A precision-machined part proves what that person can actually create - and establishes the minimum level of skill they can deliver.



OPEN THE CASE. HOLD THE PARTS. EXPLAIN THE PROCESS.

PRECISION YOU CAN SEE, FEEL AND VERIFY.

01
DESIGN + PROGRAM

Students build every model from the print, create the CAM, simulate it and post the G-code.

02
SET UP + MACHINE

Videos and checklists cover the full setup: stone, vise, parallels, stops, tools, offsets, dry run and execution.

03
INSPECT + CERTIFY

Full GD&T prints and inspection documents record every actual dimension. Student and instructor sign; passing work earns certification.

04
PRESENT + PROVE

Every pristine part enters the custom case. The student can explain finish, dimensions, threads, cavities, tooling and progression.

EVERYTHING REQUIRED TO COMPLETE THE SERIES

THE CURRICULUM PACKAGE

Dimensioned prints with full GD&T | inspection documents | student and instructor signoff | Eagle artwork/template | three guided tutorials per part | complete setup instruction

16 KENNAMETAL TOOLS

One optimized, heavily discounted carbide library machines all ten parts efficiently.

DESIGN IT. PROGRAM IT. SET IT UP. MACHINE IT. INSPECT IT. PROVE IT.

A RESUME MAKES A CLAIM. THE PARTS REMOVE ALL DOUBT.

BUILDING BLOCKS COMPLETION | TITAN-10M

YOU BUILT THE PART.
NOW PROVE IT.

Complete the tutorials. Create the CAD model. Program it in CAM. Follow the setup checklist and machine the part. Then use the final inspection report to prove that the finished TITAN-10M meets the print.

01 LEARN + DO
Follow the lessons and complete the work.

02 MEASURE + RECORD
Inspect every required feature on the part.

03 VERIFY + SIGN
A certified inspector independently checks it.

THE ACTUAL TITAN-10M FINAL INSPECTION REPORT

REV F | 3 PAGES | 42 FEATURES | TWO SETS OF MEASUREMENTS

CNC EXPERT
POWERED BY TITANS OF CNC

FINAL *INSPECTION REPORT*

MACHINIST NAME	CNC EXPERT ID	PART # / REV	INSPECTOR	INSPECTOR ID
		TITAN-10M / REV F		

TOLERANCE BLOCK	XXX ± .005 | XX ± .010 | X ± .030 | ANGLES ± 1°

FEATURE #	REQUIREMENTS	MACHINIST ACTUAL	TOOL	INSPECTOR ACTUAL	TOOL	(INSPECTOR ONLY) ACCEPTED	REJECTED
1	8.000						
2	4X R.015						
3	1.900						
4	.876						
5	NOTES						
6	.676						

ACTUAL FORM EXCERPT - CONTINUE THROUGH ALL 42 FEATURES.

MACHINIST ACTUAL
The student records the measured value and the tool used for each feature.

INSPECTOR ACTUAL
The certified instructor/inspector records an independent measurement and tool.

ACCEPTED / REJECTED
The inspector checks each result against the requirements and tolerances.

BOTH SIGN. BOTH DATE. THE WORK IS ACCOUNTABLE.

I have inspected the part referenced above and verified the measurements are accurate.

SIGNATURE: MACHINIST / **DATE:**

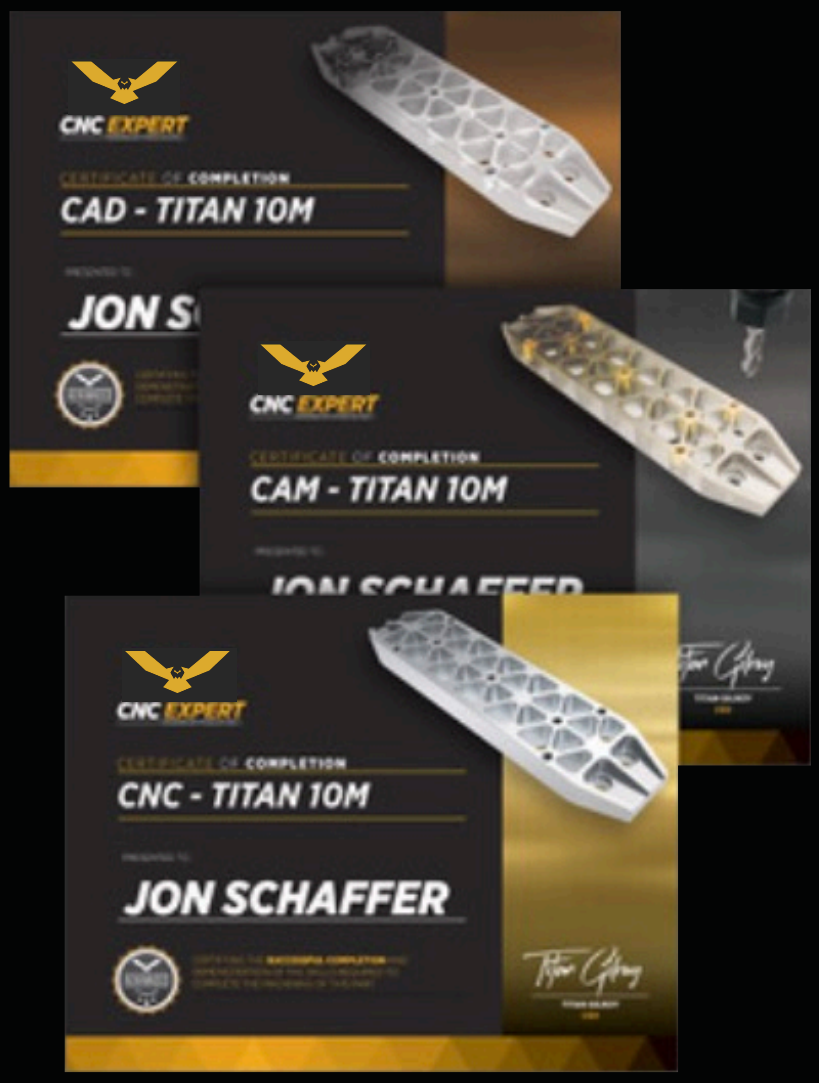
SIGNATURE: CNC EXPERT CERTIFIED INSPECTOR / **DATE:**

Submit the completed, signed report with the required CNC project evidence. TITANS of CNC reviews the submission; approved work earns the TITAN-10M CNC certificate. CAD and CAM are earned through their own assessments and project reviews.

BUILDING BLOCKS COMPLETION | TITAN-10M

ONE PART.
THREE PROVEN SKILLS.

Each certificate recognizes a different skill: designing, programming or machining. Follow the tutorials, complete the work and assessment, then submit the required evidence. Approval earns the certificate for that track.



ACTUAL TITAN-10M CERTIFICATES | EXAMPLE: JON SCHAFFER

CAD

Computer-aided design

DESIGN THE PART

Turn the engineering print into an accurate 3D model. Submit your model and complete the CAD assessment.

EARN: TITAN-10M CAD

CAM

Computer-aided manufacturing

PROGRAM THE PART

Create toolpaths and verify the machining sequence in simulation. Complete the CAM assessment and submit the required files.

EARN: TITAN-10M CAM

CNC

Computer numerical control

BUILD + INSPECT THE PART

Set up and machine the part. Measure it against the print, obtain certified-inspector sign-off and submit the required CNC evidence.

EARN: TITAN-10M CNC

MAKE YOUR SKILLS VISIBLE ON MFG CONNECT.

Show earned certifications under your profile and add photos, videos and additional projects. Share your profile link or a QR code linked to it so employers can explore your credentials and see the work behind them.

STATE RECOGNITION. GLOBAL REACH. Tornos reports Michigan recognition as the No. 1 accredited CNC machining academy for schools and Oregon industry-recognized credentials. TITANS serves learners worldwide.

SOURCE: TORNOS DECOMAGAZINE 02-2025, P. 33

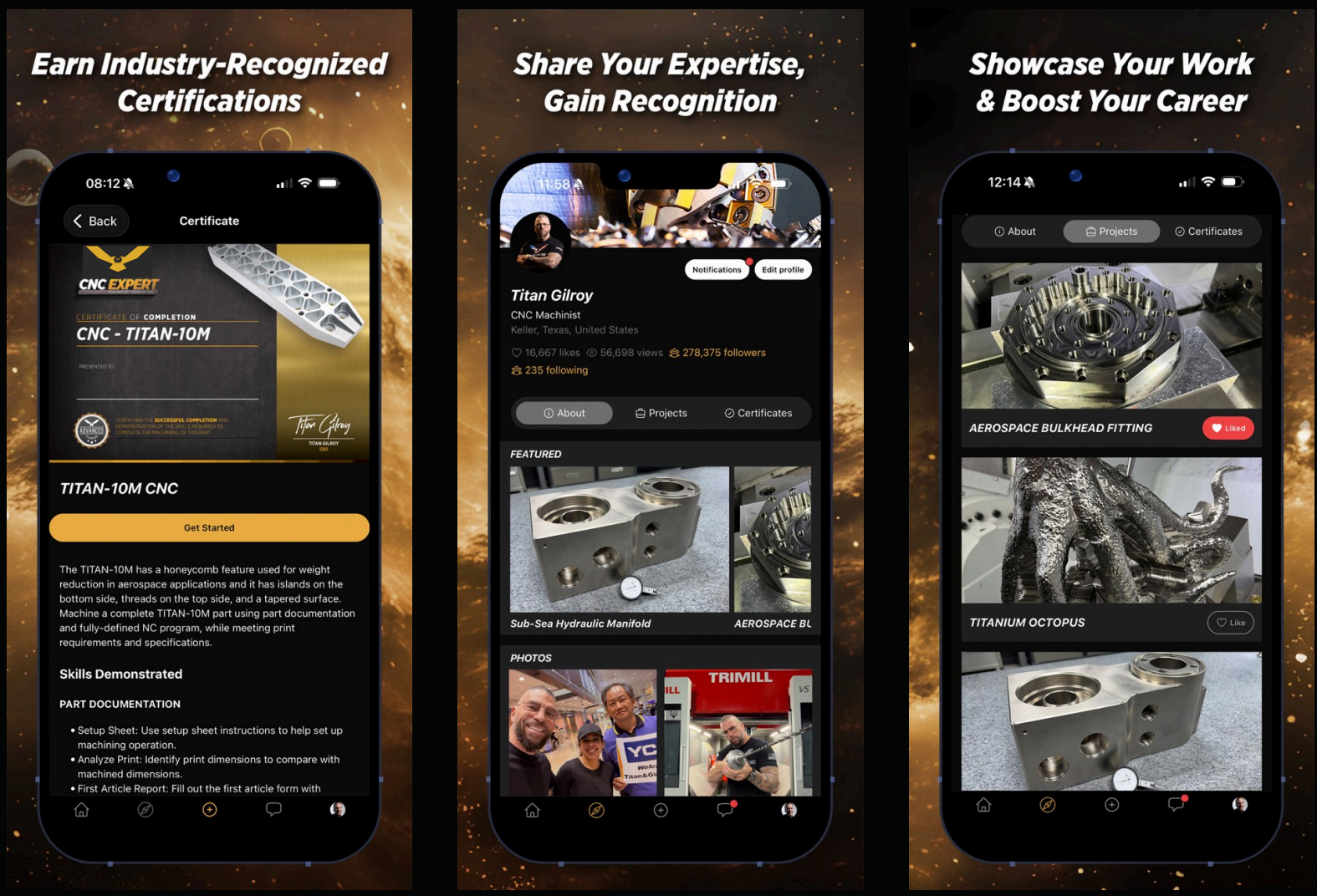
MFG CONNECT

AN APP BY TITANS OF CNC

DOWNLOAD THE APP App Store (iPhone) Google Play (Android) OR VISIT MFGCONNECT.COM

YOU EARNED IT.
NOW LET THEM SEE IT.

When your certification is approved, you receive a digital copy and it automatically appears on your MFG Connect profile. Your CAD, CAM and CNC achievements become credentials you can share with the world.



OFFICIAL MFG CONNECT APP ARTWORK

YOUR PROFILE IS YOUR PROOF OF WORK.

Bring your certifications and portfolio together. An employer can explore your skills. A potential customer can see your capabilities. Friends and fellow manufacturers can follow your progress and share what you create.

SHARE IT

Send your profile and certificates by link. A profile QR code makes them easy to open.

BUILD ON IT

Add finished parts, photos and videos. Explain the work you personally performed.

TAKE IT WITH YOU

Keep digital copies and a printed portfolio for interviews or customer meetings.

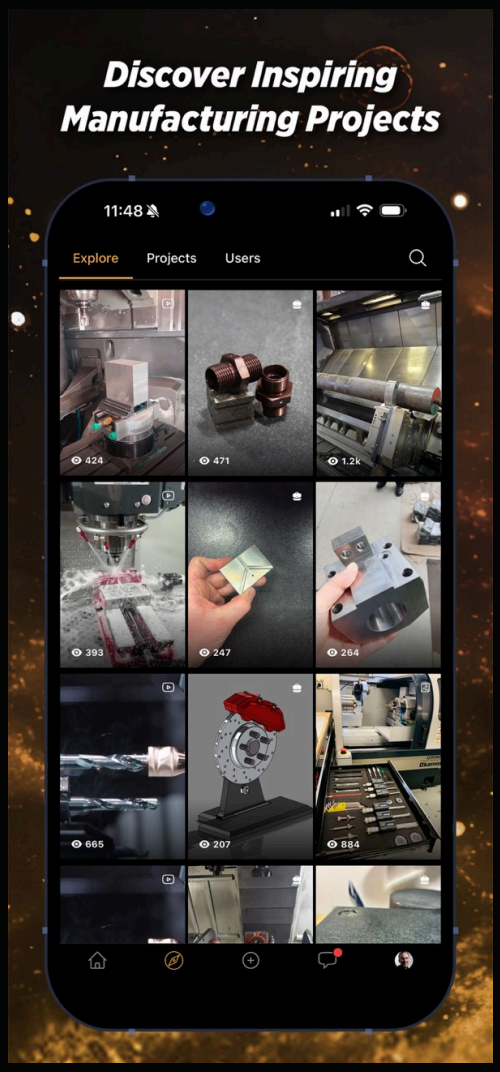
ARTWORK: TITANS OF CNC / MFG CONNECT APP STORE | PLATFORM: TITANSOFCNC.COM

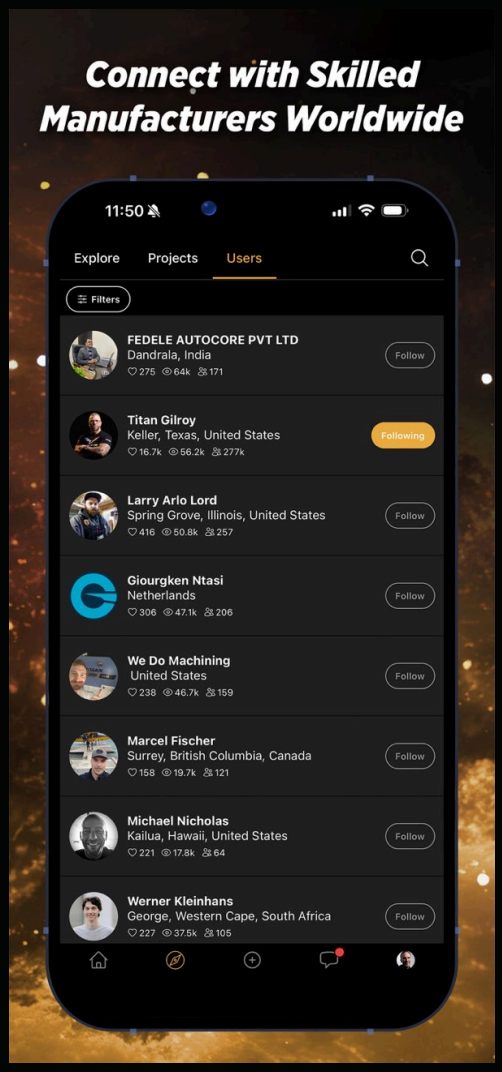
MFG CONNECT

BUILT FOR MANUFACTURING

YOUR NEXT OPPORTUNITY
STARTS WITH YOUR WORK.

Discover exceptional projects. Learn from the people behind them. Build relationships with manufacturers who need the skills you are developing.





FIND EMPLOYMENT

Explore jobs, connect with employers and use your portfolio to show what you can do.

FIND CUSTOMERS

Show your capabilities and completed work. Connect with buyers and start a conversation about their needs.

FIND YOUR PEOPLE

Meet machinists, programmers, shop owners and vendors. Ask questions, exchange knowledge and connect directly.

PROJECT DISCOVERY + INDUSTRY CONNECTIONS | OFFICIAL APP ARTWORK

MAKE EVERY PROJECT TELL A STORY.

01 SHOW THE PART

Use clear photos and videos that reveal the features and finished result.

02 EXPLAIN YOUR ROLE

Name the material, process and skills you used. Say what you did yourself.

03 PROVE THE RESULT

Connect the work to your certifications and explain the challenge you solved.

BUILD YOUR PROFILE. BUILD YOUR FUTURE.

MFGCONNECT.COM

SCAN TO EXPLORE | JOIN THE COMMUNITY

ARTWORK: TITANS OF CNC / MFG CONNECT APP STORE | PLATFORM: TITANSOFCNC.COM

WHY A CUSTOM APPRENTICESHIP MATTERS

BUILD THE WORKFORCE YOUR COMPANY NEEDS

Your company's future depends on people who can turn its equipment, knowledge and ambition into exceptional parts. A custom apprenticeship makes that capability something you can build, instead of something you can only hope to hire.

30,400

Projected U.S. openings each year for machinists and tool-and-die makers, 2025-2035. Mostly replacement needs.

1.9 MILLION

U.S. manufacturing jobs could remain unfilled by 2033 if workforce challenges persist. A sector-wide estimate.

YOUR PROCESS IS A COMPANY ASSET

Every great shop develops knowledge that makes its work better: how to hold a difficult part, how a material behaves, which tool lasts, and where a process can fail. When that knowledge lives only in a few people's heads, the company remains dependent on their presence. A custom training platform turns that experience into a foundation the entire team can build on.

That matters because repeatable quality creates confidence. The process discipline behind ISO 9001 and AS9100 connects clear methods, capable people and continual improvement. When employees understand both the standard and the reason behind it, they are better equipped to protect quality, recognize problems and improve results. Your best method becomes a shared expectation rather than a personal advantage.

The return reaches beyond training. Better understanding can reduce avoidable scrap, rework and delays. More people become capable of taking responsibility. Experienced machinists gain a way to pass on what they know, and the business becomes less vulnerable when someone leaves or retires. The next generation starts with the knowledge your company has already earned.

A FOUNDATION YOU CAN MAKE YOUR OWN

TITANS of CNC gives you a powerful starting point: machining fundamentals and a progression from building-block projects to more demanding work. Apprentices develop understanding of programming, tooling, workholding, materials and inspection. That foundation helps them see how spindle capability, cutting forces, rigidity and coolant affect the result. They begin learning to think through the whole machining process.

Your company builds on that foundation with its own machines, parts, materials, customer requirements and proven processes. This connection gives learning a purpose. Each new skill becomes more valuable because it applies to the work your team actually performs. As the work grows more complex, your people can grow with it. You are developing capability that fits your business.

For the apprentice, that investment can change what a career looks like. A visible path from beginner to skilled contributor, with increasing responsibility and pay tied to demonstrated value, creates a reason to keep growing. People see a company investing in their future and their ability to care for their families. That can deepen commitment while strengthening the business. Building your own workforce is an investment in both.

Build on the Academy. Make it your own.

Give your people a future and your company the capability to grow.

HOW TO BUILD YOUR PROGRAM

8 STEPS TO CREATING YOUR OWN CUSTOM APPRENTICESHIP PROGRAM

Follow these steps in order to build a company-specific training program. Use TITANS of CNC for the foundation, then add your shop's work standards and expectations.

STEP 1 BUILD YOUR PLAN AROUND THE TITANS OF CNC ACADEMY

Make the TITANS of CNC Academy the foundation of your apprenticeship program. Start by deciding whether your apprentices will focus on milling, turning, or both. We recommend beginning with the Building Blocks, starting with TITAN-1M for milling, to establish a strong foundation before progressing to more advanced projects. Identify the Academy series you want to tackle next, whether that's the Rocket or another series that supports your company's goals. The Academy provides the prints, setup sheets, inspection documents, and instructional videos your team needs to learn each project. As your apprentices grow, you can adapt materials and tooling to match the work your company does, whether that's stainless steel, superalloys, plastics, or something else. Set clear goals for where you want the program to go and decide how much time each week you can dedicate to getting there.

STEP 2 CHOOSE YOUR PROGRAM LEADER AND MENTORS

Choose a skilled program leader who wants to teach, can explain decisions clearly, and models your shop's standards. Before guiding apprentices, this person should spend time learning how the TITANS of CNC Academy curriculum works. A great place to start is by making TITAN-1M: design, program, and machine the part while working through the same resources your apprentices will use. These include the prints with full GD&T, setup sheets, setup checklists with links to instructional videos, and the final inspection document.

Have your leader join MFG Connect and get certified. Going through the complete process firsthand builds the knowledge and confidence to guide others. Your leader should also be able to check an apprentice's work throughout the process and properly measure and document the finished part.

Choose a backup mentor as well, and involve as many skilled people as possible. A strong team of mentors gives apprentices more support and helps keep your program moving.

STEP 3 RESERVE THE TIME, SPACE AND EQUIPMENT

Put recurring training hours on the work schedule for both mentor and apprentice. Reserve a defined area or reliable access to suitable machines, computers, tooling, workholding, measuring equipment and materials. Budget those resources and plan production coverage so training time is protected. Confirm that the chosen equipment can support the projects you intend to teach. SOLIDWORKS and Mastercam both offer affordable student options, so take advantage of these opportunities for apprentices to learn CAD and CAM.

Output: A training calendar, equipment-access plan and approved resource budget.

HOW TO BUILD YOUR PROGRAM

8 STEPS TO CREATING YOUR OWN CUSTOM APPRENTICESHIP PROGRAM

STEP 4 SET THE SAFETY AND ASSESSMENT RULES

Write the required safety orientation, supervision levels and machine-specific authorization rules. Use your shop's safety procedures and the equipment manufacturer's instructions. You can also show the TITANS of CNC safety video, which is available through the setup checklist.

Define who may authorize each task and who signs off each skill. Create a checklist covering safe practice, planning, setup, machining and inspection against print tolerances. Require observed performance as well as understanding.

Output: Safety requirements, authorization rules and practical assessment checklists.

STEP 5 ENROLL APPRENTICES AND AGREE ON THE PLAN

Bring everything you've established into a clear, written apprenticeship plan built around the TITANS of CNC Academy curriculum. Document the Academy series your apprentices will progress through, the specific parts you've selected, and the overall goals for your company's program. Include the training schedule, milestones, and next review date so everyone understands the path forward. Review the plan with each student or apprentice and have them sign off on it.

Make the opportunity clear. Every part an apprentice completes builds their knowledge, sharpens their skills, and takes them to a higher level as a machinist. As they become capable of producing more challenging parts and contributing more to the company, they can grow into a valued pillar of the team and create opportunities for higher pay, a stronger career, and a better future for their family.

STEP 6 BUILD SKILLS THROUGH REPETITION

The TITANS of CNC Academy curriculum is built on repetition. Begin with TITAN-1M: design it, program it, and machine it. Then move on to TITAN-2M, TITAN-3M, and the remaining Building Blocks. The material stays the same while the lengths and features change, and each part builds on the skills learned before it. With every project, apprentices gain knowledge, speed, and confidence.

As apprentices make each part, mentors can teach the skills used throughout the shop. For example, teach them to use the saw to cut raw material and inspect it before machining. Guide them through setup, machining, and inspection as their abilities grow.

Use the TITANS of CNC inspection series alongside hands-on mentoring to teach apprentices how to use calipers, micrometers, depth micrometers, and other measuring tools. Have them measure and document each completed part.

After completing the first 10 Building Blocks, move on to the Rocket, the Fixture Series, or another Academy series that fits your company's goals and the work you do. Keep progressing, one part at a time.

HOW TO BUILD YOUR PROGRAM

8 STEPS TO CREATING YOUR OWN CUSTOM APPRENTICESHIP PROGRAM

STEP 7 VERIFY THE SKILLS AND APPROVE THE NEXT STAGE

As apprentices complete each part, double-check their inspection results and continue teaching the skills they need to succeed. Help them understand how to measure each feature against the print, make the necessary adjustments, and dial in every dimension. The goal is for them to understand the complete process and produce a part that meets the print with confidence.

Help each apprentice join MFG Connect and work toward TITANS of CNC Academy certification in CAD, CAM, and CNC machining. TITANS of CNC offers classes throughout the year that qualify inspectors to sign off on the inspection documents for finished parts. Once a qualified inspector signs the completed inspection document, upload it to MFG Connect to release the CNC machining portion of the certification.

Review each apprentice's progress, reinforce any skills that need more work, and approve the next stage when they are ready. Each completed project is an opportunity to build stronger skills and take on more responsibility.

STEP 8 REVIEW RESULTS AND KEEP THE PROGRAM CURRENT

Schedule weekly mentor check-ins and monthly program reviews. Work with each apprentice to review their progress and identify opportunities to improve quality, reduce scrap and rework, and increase speed and accuracy. Celebrate their growth while helping them focus on the skills they need to strengthen.

Review the program as a whole, too. Fix unclear lessons, scheduling problems, and resource gaps. Keep your documentation current and maintain an obsession for improvement in your training, equipment, and teaching methods. Record changes and discuss them with your apprentices and program leaders. Add more apprentices only when you have the mentors and supervision to support them properly.

Remember, you are there to support each individual. You're helping change someone's life while securing a great future for your company. Training your own employees and lifting them up is an essential step in building a winning culture where your company can thrive. Take that responsibility seriously. Speak into your apprentices and help them rise to greatness in their careers and in every aspect of their lives.

A company's greatness is determined by its employees. Trust me when I say this apprenticeship program can change the course of your company and help you reach levels of success you never thought possible. BOOM.