

The Innovaqueros Makerspace

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(Shapeoko 3)

CNC ROUTER TRAINING MANUAL

START PRESENTATION

Prepared by: Alvaro Silvestre (MECE Student)
Revision: Dr. Noe Vargas in 10/07/2025



The Innovaqueros Makerspace

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This presentation covers the theoretical portion of the Shapeoko CNC Cutter Certification.

✓ To complete your certification:

- Visit the UTRGV Makerspace
- Ask the staff for instructions on the hands-on session

Once both parts are completed, you'll earn your official CNC Cutter
Certification Badge! 🏆

THEORY

🔧 For any questions, feedback, or support,
contact us at the Makerspace Desktop, or via
email:

✉️ makerspace@utrgv.edu

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SAFETY RULES

"RESPECT THE TOOL"

- NEVER leave the machine unattended
- Keep hands out of the cutting envelope while running
- PPE required: eye, ear, and respiratory protection
- No loose clothing; remove jewelry (necklaces, watches, rings, wristbands, earrings, etc.)
- Long hair past shoulders: bun or under hat
- Power switch OFF before plugging in
- Clear the area of cables/debris; nothing under rails
- Do NOT cut prohibited/unknown materials — ask staff first

BACKGROUND & PURPOSE

What is a CNC Router?

- A precision tool that uses a high-speed spindle and computer-controlled motion to cut/engrave materials.

What will you learn?

- Setup, safety, workholding, software workflow, supervised cutting, and cleanup.

What do we use at the Makerspace?

- Shapeoko 3 router with Carbide Motion control software (and Carbide Create or equivalent for CAM).
- Staff supervision is required for certification activities

.Materials Policy

- Allowed: wood, plastics
- Aluminum: only in specific instances — ask Makerspace staff



Shapeoko 3 CNC Router



YOUTUBE TUTORIALS



Intro tutorial 

(Get to know the CNC)



Quick Tutorial 

(Get to know the CNC
+ First Cut)

RESOURCES

Open Assembly Guide (Shapeoko 3)

Navigate Getting Started with CNC

Explore Shapeoko Jumpstart (Starter Projects)



Note: All the starter projects in Shapeoko Jumpstart are acceptable as your training piece. Each project includes step-by-step design videos and tutorials. You may prepare your design before your supervised session.

FILE PREPARATION



- 1.- Design/CAD: Create or import geometry
- 2.- CAM/Toolpaths: Use approved CAM (e.g., Carbide Create / Fusion 360)
- 3.- Post-process to .nc (G-code)
- 4.- Get staff approval for the file, material, and workholding
- 5.- Bring your USB/cable if needed



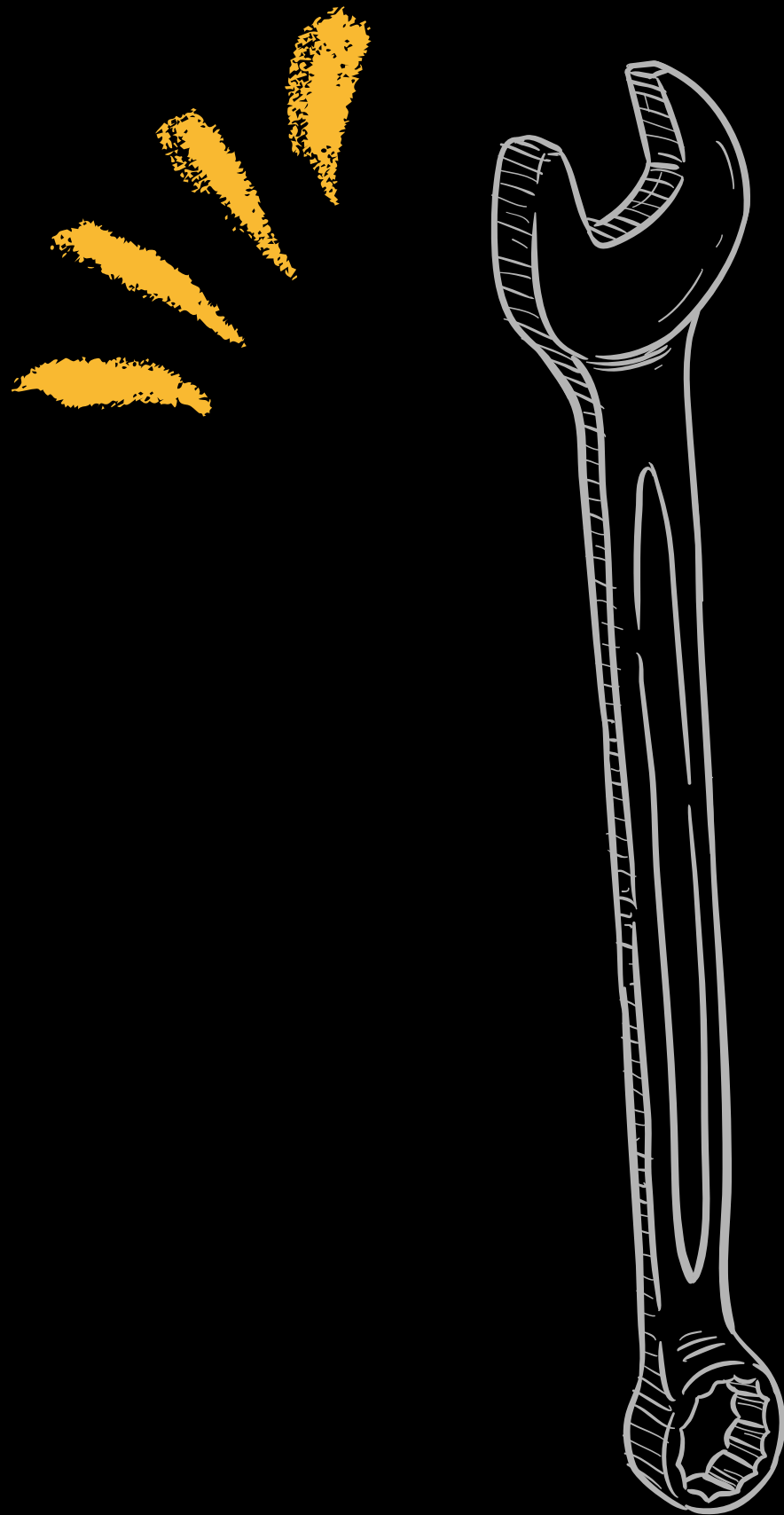
To complete the Practical Part, review the following sections and then visit the Makerspace and ask the Staff at the Service Desk for help.
Do not operate the CNC Router without Staff Supervision.

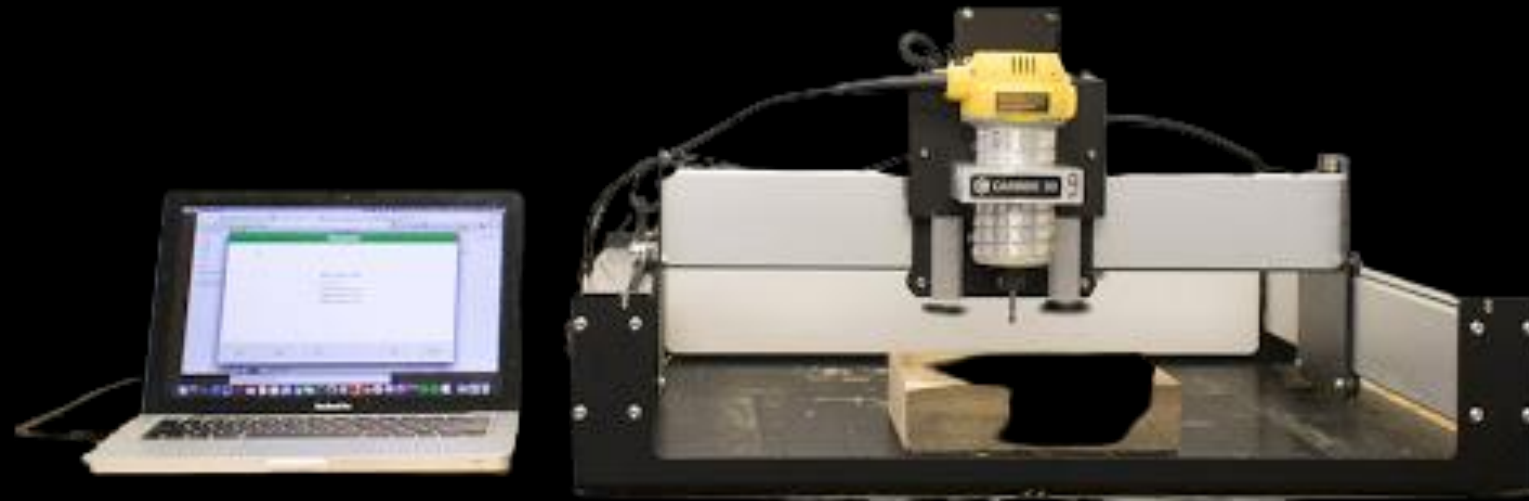


CNC OPERATION (PT. 1)

Pre-Check & Setup

- Staff perform daily checks; machine is prepared for use
- Secure workpiece right-side up in desired orientation with proper hold-down
- Ensure no cables/debris in motion path; nothing under rails
- Connect USB from Carbide Motion board to the computer
- Launch Carbide Motion 5
- Turn ON Shapeoko (red in-line rocker → ON); blue light on the board





CNC OPERATION (PT. 2)

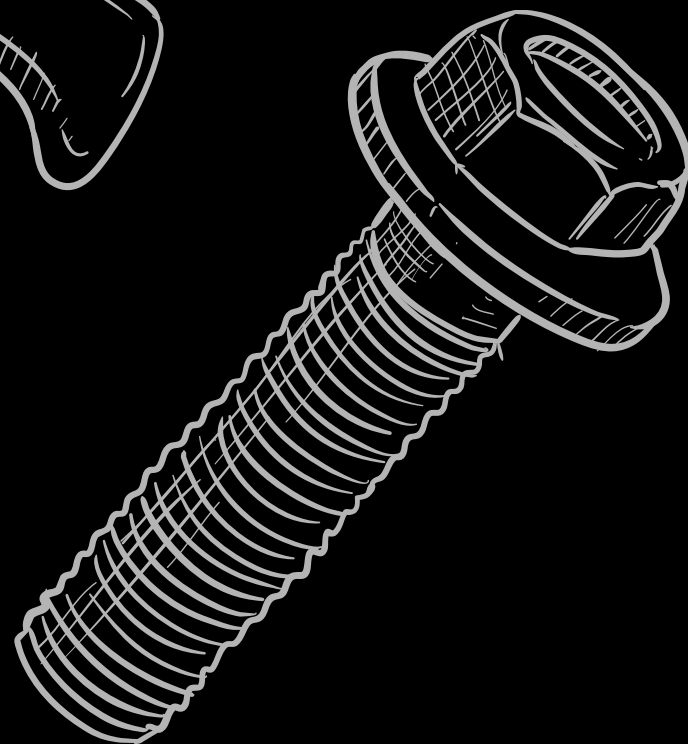
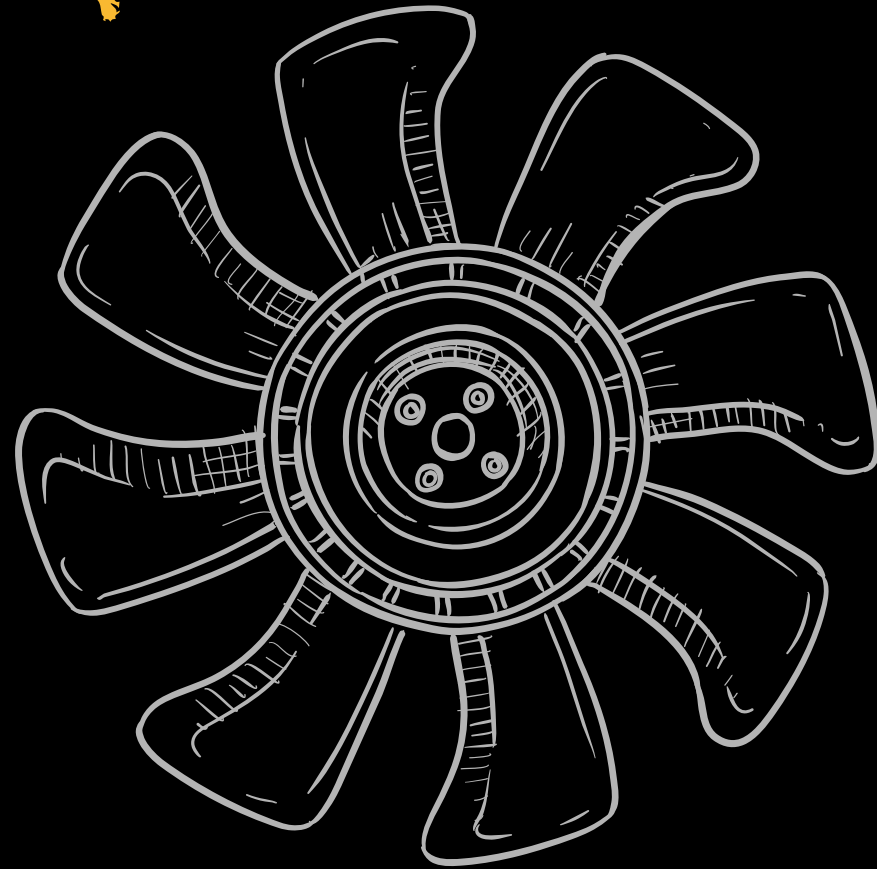
Zeroing & Run

- Home/Zero the tool correctly relative to the workpiece
- Load the NC (G-code) file
- Start the compact router and set correct RPM
- Supervise actively — watch dust/debris/fumes and any loosening
- If visibility is poor or anything loosens: notify staff immediately (do not reach in)
- After the Job
- Turn OFF the router; return gantry to home
- Wait until the bit fully stops before removing parts
- Clean the area; leave the station ready for the next user

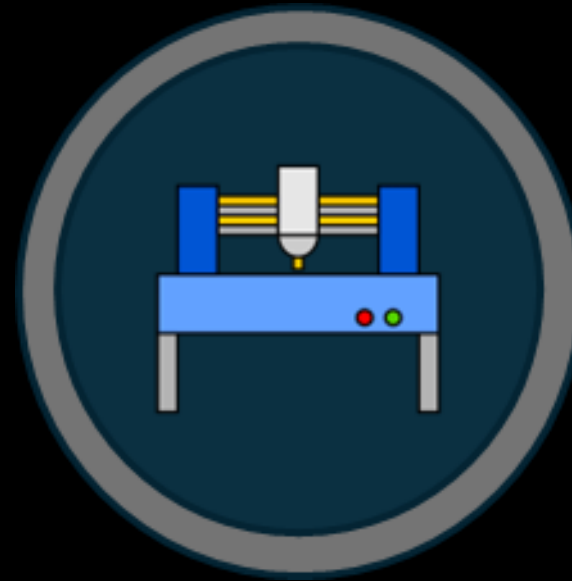
FINAL CHECKLIST AND BADGE

Before receiving your badge:

- ✓ Watched tutorials
- ✓ Scheduled & completed test cut
- ✓ Passed Safety Rules
- ✓ Staff approved your file and cut
- ✓ Understood materials rules

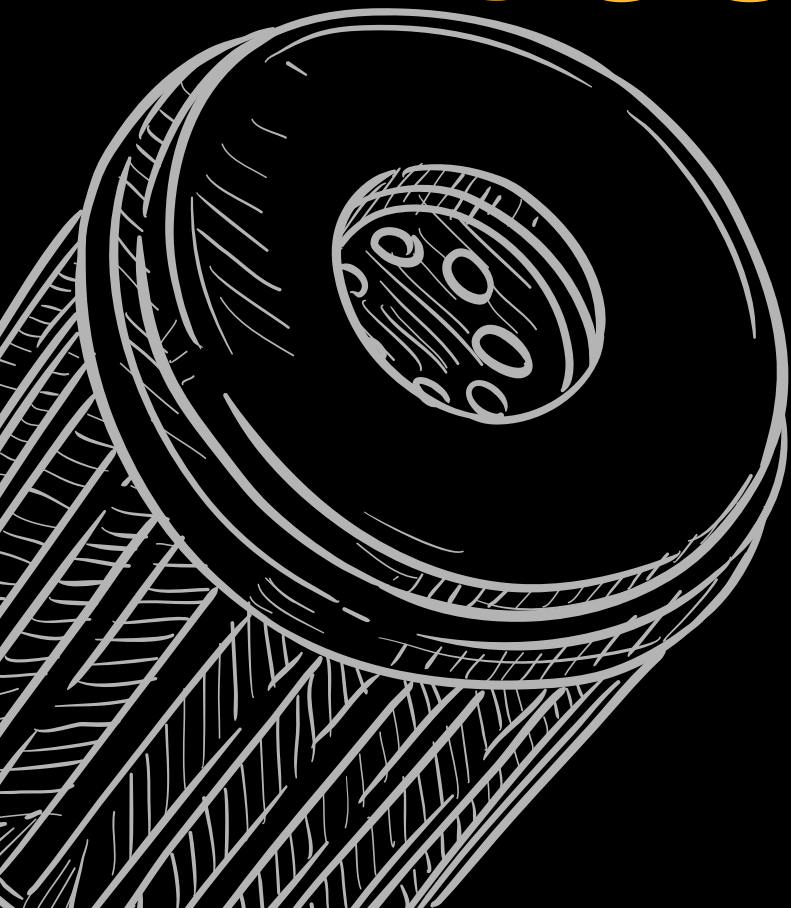


CONGRATULATIONS!



**YOU'VE EARNED YOUR CNC ROUTER
CERTIFICATION**

**(Pick up the badge at the Makerspace
Desktop)**



The Innovaqueros Makerspace

[Click for English](#)



(Shapeoko 3)

MANUAL DE ENTRENAMIENTO ROUTER CNC

EMPEZAR PRESENTACIÓN



Preparado por: Alvaro Silvestre (MECE Estudiante)
Revision: Dr. Noe Vargas en 08/29/2025

Esta presentación cubre la parte teórica de la Certificación de Router CNC (Shapeoko).

✓ Para completar tu certificación:

- **Visita el Makerspace de UTRGV**
- **Pide al personal la sesión práctica**

Al completar ambas partes, recibirás tu Insignia de Certificación en Router CNC 🏆



**🔧 En caso de preguntas o dudas,
contactanost en el escritorio del Makerspace ,
o via email:**

👉 makerspace@utrgv.edu

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03 TUTORIALES DE YOUTUBE

04 RECURSOS ADICIONALES

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06 OPERACIÓN DEL CNC (PT. 1)

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08 CHECKLIST FINAL E INSIGNIA



REGLAS DE SEGURIDAD

"RESPETA LA HERRAMIENTA"

- NUNCA dejes la máquina sin supervisión.
- Mantén las manos fuera del área de corte mientras está en operación.
- EPP obligatorio: protección ocular, auditiva y respiratoria.
- Sin ropa suelta; retira joyería (collares, relojes, anillos, pulseras, aretes, etc.).
- Cabello largo por debajo de los hombros: en chongo o debajo de una gorra.
- Interruptor de energía APAGADO antes de conectar.
- Mantén el área libre de cables/residuos; nada debajo de los rieles.
- NO cortes materiales prohibidos o desconocidos — consulta primero al personal.

TEORIA Y PROPOSITO

¿Qué es un Router CNC?

Una herramienta de precisión que usa un husillo de alta velocidad y movimiento controlado por computadora para cortar/grabar materiales.

¿Qué aprenderás?

Configuración, seguridad, sujeción de la pieza, flujo de software, corte supervisado y limpieza.

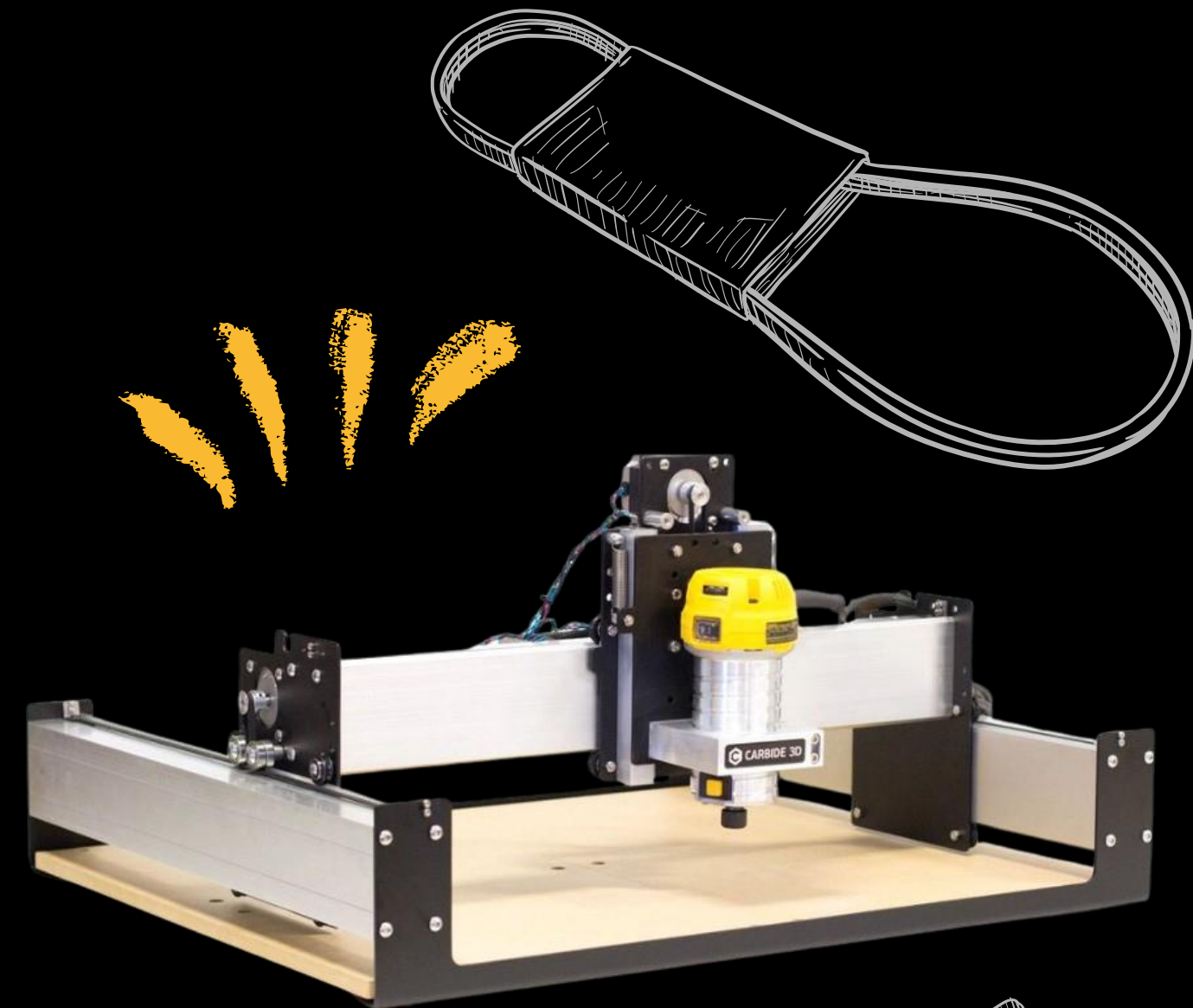
¿Qué usamos en el Makerspace?

Router Shapeoko 3 con el software de control Carbide Motion (y Carbide Create o equivalente para CAM).

La supervisión del personal es obligatoria para las actividades de certificación.

Política de materiales

- Permitidos: madera, plásticos
- Aluminio: solo en casos específicos — consulta al personal del Makerspace



Shapeoko 3 CNC Router



TUTORIALES DE YOUTUBE



Tutorial de Introduccion 

(Familiarizate con las partes de la CNC Router)



Tutorial Rapido 

(Familiarizate con las partes de la CNC Router + Primer Corte)

RECURSOS ADICIONALES

- Checa** Assembly Guide/Guía de Ensamble (Shapeoko 3)
- Navega** Getting Started with CNC/Introducción al CNC
- Explora** Shapeoko Jumpstart/Proyectos Iniciales



Nota: Todos los proyectos iniciales de Shapeoko Jumpstart son válidos como tu pieza de entrenamiento. Cada proyecto incluye videos y tutoriales paso a paso. Puedes preparar tu diseño antes de tu sesión supervisada.

PREPARACIÓN DE ARCHIVOS



- 1.- Design/CAD: Create or import geometry
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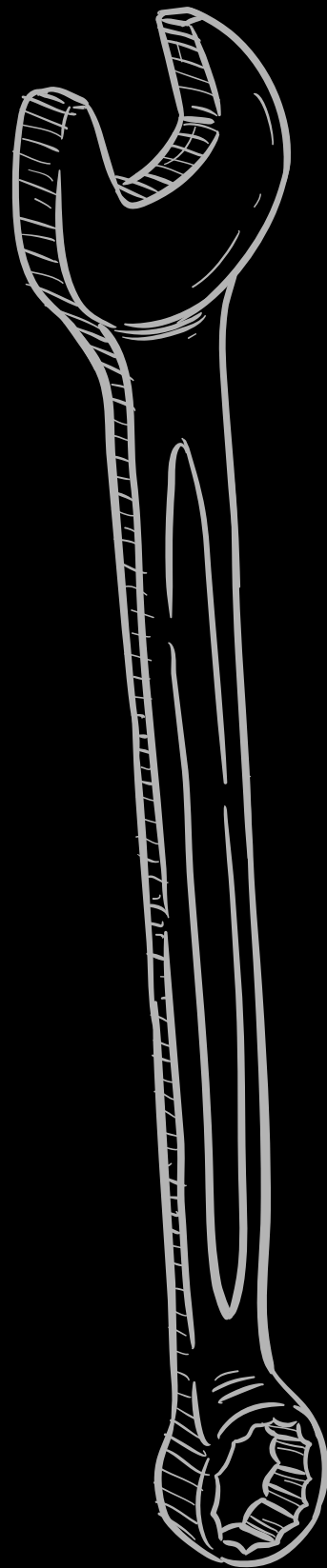
Para completar la Parte Practica, revisa las siguiwntes secciones y despues visita el Makerspace y pide ayuda al Staff.

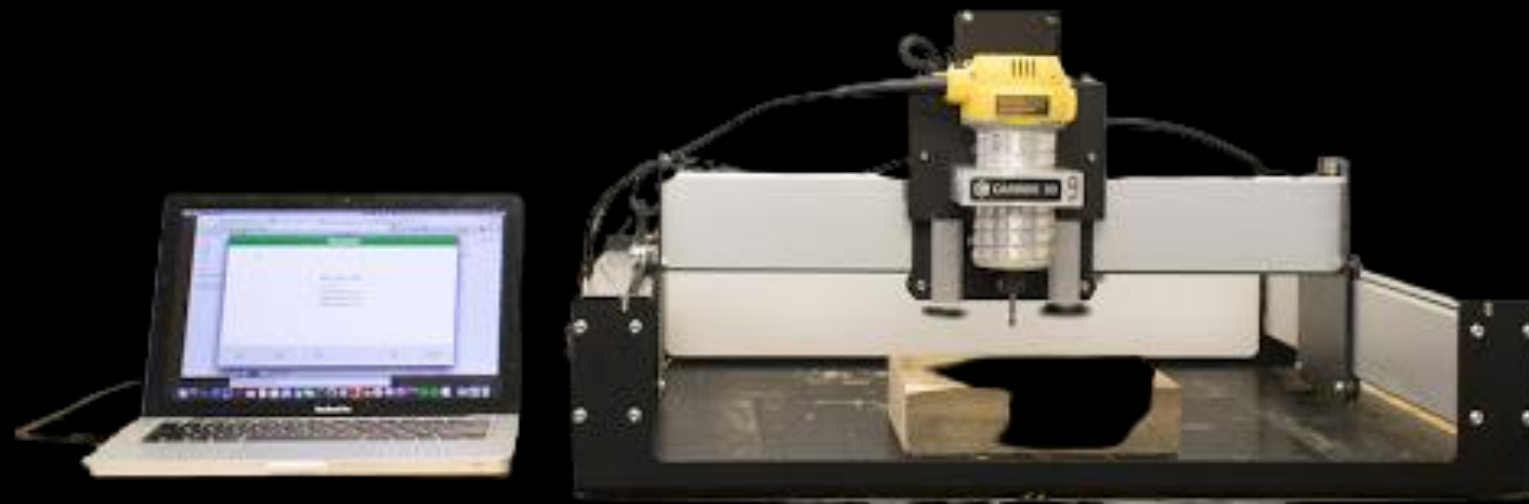
No operes el CNC Router sin supevisión del Staff.

OPERACIÓN DEL CNC (PT. 1)

Pre-Check & Setup

- Staff perform daily checks; machine is prepared for use
- Secure workpiece right-side up in desired orientation with proper hold-down
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OPERACIÓN DEL CNC (PT. 2)

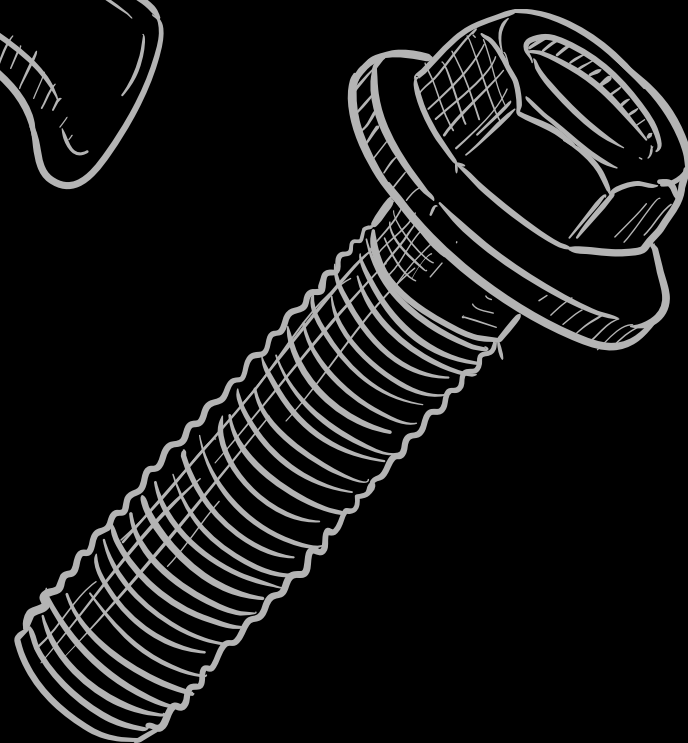
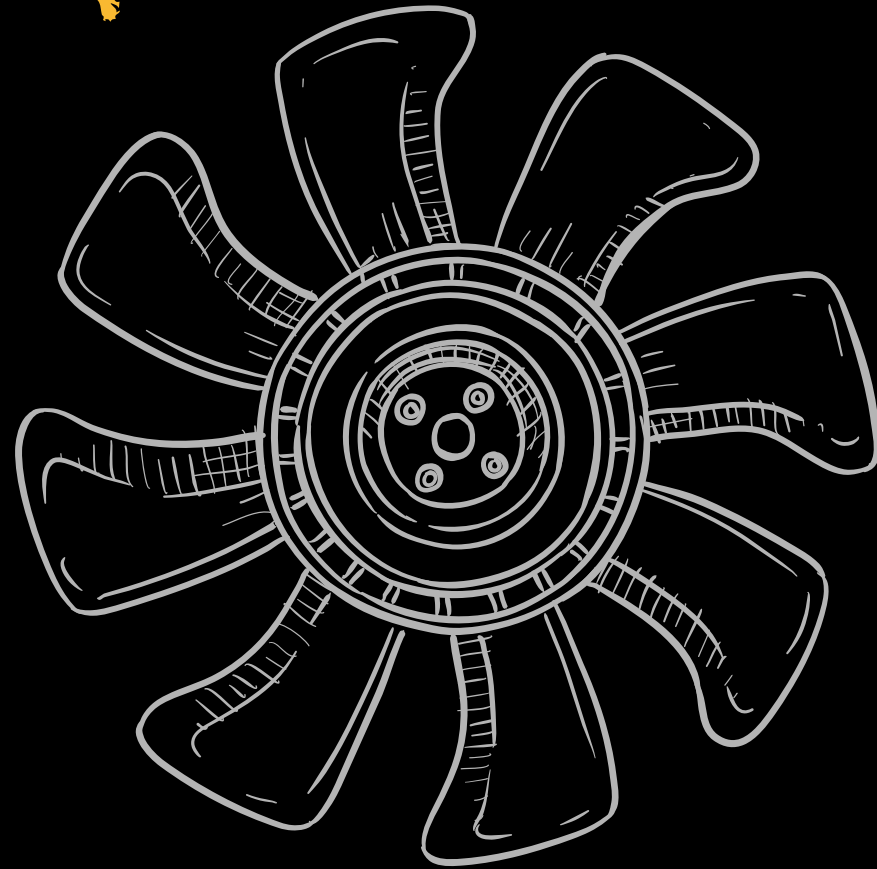
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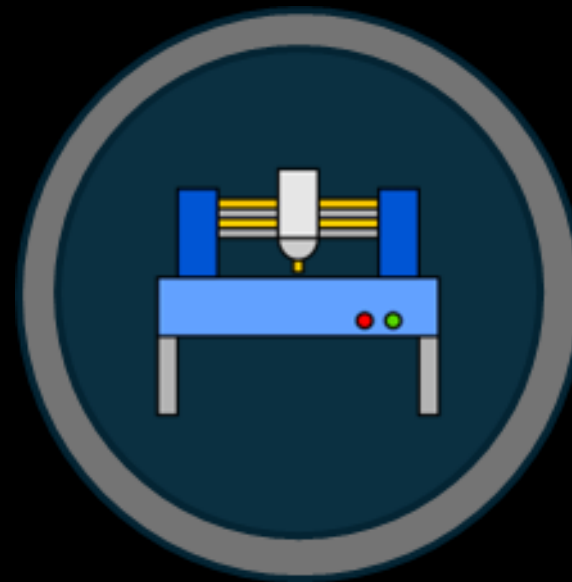
CHECKLIST FINAL E INSIGNIA

Antes de recibir tu insignia:

- ✓ Viste los tutoriales
- ✓ Programaste y completaste la prueba de corte
- ✓ Aprobaste las Reglas de Seguridad
- ✓ El personal aprobó tu archivo y tu corte
- ✓ Comprendiste las reglas de materiales



¡FELICIDADES!



HAS COMPLETADO TU CERTIFICACIÓN EN ROUTER CNC

(Pasa a recoger tu insignia en el escritorio del
Makerspace.)

