



# SNS COLLEGE OF TECHNOLOGY



**Coimbatore-35**

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## DEPARTMENT OF MECHATRONICS ENGINEERING UNIT II – STRUCTURE OF CNC MACHINE TOOLS



# Introduction

- In CNC (Computer Numerical Control) machines, guideways play a critical role in guiding and controlling the movement of the machine's cutting tool or workpiece with high precision.
- The choice of guideway type in CNC machines is crucial for achieving the desired level of accuracy, speed, and reliability.
- Here's how friction, anti-friction, and other types of guideways are commonly used in CNC machines:



# CNC Machine Building



Building a CNC machine can be a complex and time-consuming endeavor, and it requires a good understanding of mechanical and electrical systems, as well as programming and software knowledge. Additionally, safety is a top priority, so be sure to take all necessary precautions to protect yourself and others when working with CNC machines. If you are new to CNC, it might be helpful to start with a DIY kit or seek guidance from experienced builders or online communities dedicated to CNC machine building.

## **Design Your CNC Machine:**

- Create a detailed design or choose an existing design that suits your needs.
- Plan the machine's frame, axis system, and work area.
- Select the appropriate linear motion components (rails, screws, bearings).
- Choose a spindle or tool head suitable for your intended application.



# Structural Details



Remember that the specific structural details will vary depending on the type and size of CNC machine you are building. It's essential to carefully plan, design, and build the structural elements to meet your project's requirements and provide a solid foundation for precise CNC operations. Additionally, consulting machine plans or seeking advice from experienced builders can help you make informed decisions during the construction process.

## Frame Construction:

- The frame provides the structural support for your CNC machine. It should be sturdy and rigid to prevent unwanted vibrations and ensure accurate machining.
- Common materials for frame construction include aluminum extrusions, steel, welded metal frames, or even heavy-duty wooden frames.
- Use precision machining techniques to ensure the frame components fit together accurately.



# Configuration And Design



- The configuration and design process is critical to the success of your CNC machine project.
- It's important to approach this phase methodically, taking into account your specific needs and goals.
- If you're new to CNC machine design, you may find it helpful to consult with experienced builders or engineers and access online resources and forums dedicated to DIY CNC machine construction for guidance and support.
- Select key components, including motors, linear motion systems (rails, bearings, leadscrews, or ballscrews), spindle or tool head, and control electronics.
- Ensure that these components are compatible and suited to your machine's purpose.