



## About Hytech Automation

Hytech Group, established in the year 1992 is a technology oriented manufacturing industry based in Pune, Maharashtra, India. Hytech group started as Hytech Hydraulics catering to hydraulics automation requirement for process industries. Now, there are Today, Hytech Group owns four verticals broadly classified as under -

- Hytech Automation
- Hytech Automation – Didactic Solutions
- Hytech Hydraulics
- Hytech Distribution

### Hytech Automation

Hytech Automation is one of the channel partners for the integration of Fanuc Industrial Robots. Core activity of Hytech Automation is automation related solutions. This is a project oriented division that caters to industrial robotics integration as well as application oriented process integration. Few top clients include Maruti Suzuki, Indian Railways, LG India, etc.

Hytech Automation also manufactures special purpose machines required for technologically advanced applications. One of the most successful product is Laser assisted CNC Turning machine which was developed in collaboration with DRDO – INDIA and LZH – Germany. This specially designed CNC turning machine can machine components up to 78 HR.

### Hytech Automation – Didactic Solutions

Hytech Automation – Didactic Solutions mostly deals with the Automation and Application Engineering related Educational Solutions. These Didactic Solutions involve manufacturing of training kits as well as services such as ‘Syllabus Designing’ and ‘Train the Trainer Program’. There are four verticals in this division namely, CIM – Computer Integrated Manufacturing, Mechatronics, CNC Machines and Robotics.

With more than 20 years’ experience in the field of technological solutions, Hytech Automation – Didactic has acquired necessary expertise to provide industry oriented educational solutions which are relevant almost all over the world.

Hytech Automation is authorized channel partner for Fanuc Robots as well as Fanuc CNC related products. With client base in more than 25 countries, ‘Hytech Automation – Didactic Solution’ has more than 3000 active customers in educational as well as industrial sector. Few of the reputed customers include Maruti Suzuki - India, Bosch – India, Indian Navy, Mahindra and Mahindra, Myanmar Navy, Singapore Polytechnic, Khartoum University - Sudan, Palestine Technical University, etc.

### Hytech Hydraulics

Hytech Hydraulics is the oldest vertical under Hytech umbrella. It caters to the hydraulic related automation as well as project requirements in process industry. Few top clients include Thyssen Krupp, Wonder Cement, Ambuja Cement, Dalmia Cement, etc. Hytech Hydraulics has supplied more than 300 kiln thrusters operating in 4 different continents. Few of the kiln thrusters are operational 24 x 7 for more than 22 years.

Hytech Hydraulics has designed and patented a fine flow control valve which is considered as a monopolistic product in the cement industry. More than 2000 such valves are operational in various cement plants all across the globe.

### Hytech Distribution

Hytech Distribution is the trading arm of Hytech Group. Over the years, Hytech Group has established collaborations with few reputed manufacturers as well as service providers from all over the world. Hytech holds distributorship of BobCAD – CAM, Fanuc NC Guide, Fanuc Roboguide, Fanuc Simulator, Visual Components, IRAI – Automgen, etc.



**VERTICALS**

**CNC TRAINING MACHINES**



**HYTECH**  
 Since 1992  
 www.hytechautomation.in




**CNC Simulator (SIEMENS and FANUC)**



**HYTECH**  
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**CNC Maintenance Training Kits**



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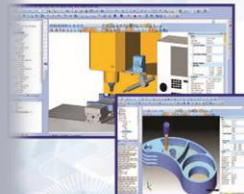


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**'CAD – CAM EXPERT' module with CNC Hardware simulator:**

This is an additional module which can be installed along with any of the CIM layouts. This module provides hands on experience to students on CNC turning as well as Milling technology instructors can carry out CAD as well as CAM training right from scratch with this optional module.



**CAD CAM EXPERT MODULE**

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**CNC TRAINING MACHINES**



- More than 1900 installations all over India
- More than 1200 active customers all over India
- More than 80 installations in 12 countries with dedicated support teams in 3 different countries
- Complete solution from CAD – CAM based design to complete machining
- Industrial quality machines designed specifically for training purpose
- Education specific softwares and simulators
- Support and Service available for machines manufactured from 1998

- Maruti Suzuki Capability Development Center – Manesar
- BOSCH India Ltd – Nashik
- Mahindra and Mahindra (Farm) – Kandivali
- IIT Delhi
- IIT Guwahati
- NIT Warangal
- NIT Andhra Pradesh
- TRTC Patna
- IGTR Ahmedabad
- IDTR Varanasi
- TVETA Kenya (32 Centers)
- Gandhi-Mandela Centre of Specialisation – South Africa



### Why HYTECH Trainer Machines are better suited for Education

- **Often IN EDUCATIONAL INSTITUTIONS, you'll see big industrial machine tools sitting on a shop floor completely unused. Why is this?**

This is a classic example of purchasing the wrong piece of equipment for teaching purposes. Training machinists is one thing but this is applicable to programs that are essentially teaching students to make widgets and parts.

Programs like engineering, polytechnic, ITI, industrial design, and machining technology all need to teach students how to operate CNC equipment. However, large, industrial machines are intimidating, unsafe, and difficult to use. Hence they go unused.

Instead, educators should consider an industrial quality educational CNC machine for education. There are a few things to consider as you look at different systems. Hytech CNC Machines are designed with keeping all these concepts in mind which can offer an optimum solution providing high quality training machines.





### Why HYTECH Trainer Machines are better suited for Education

- **Size isn't everything:**

A robust machining program will teach machine setup, tool offsets, programming, tooling, fixturing, feeds and speeds, and CNC control operation. While this sounds like a lot (and it is), you don't need a huge industrial machine to accomplish this. You can just as easily use a smaller machine that is equipped to cut steel, and accomplish the same set of objectives.

The key here is to make sure the machines you're considering are industrial *quality*. Industrial quality does not necessarily equate to a bigger size system. Hytech CNC machines are designed with industrial standards which provide all necessary operations which can be considered as necessary for CNC machine operational training course.

- **Consider educational safety features:**

While most CNC machines are enclosed, they don't necessarily all have the same safety features. For example, Hytech machines have a guarded enclosure that won't allow the machine to run if the door is open. There are sensors as well as limit switches over and above the software limits to avoid over travel and subsequent accidents. Additional electrical safety provisions are provided in Hytech machines such as phase reversal prevention, MCBs as well as filters.

Other machines on the market simply don't go this far to keep students safe. In educational environments, safety is of paramount importance, so these types of features should be at the top of your list.





### Why HYTECH Trainer Machines are better suited for Education

- **Industrial production machines VS Trainer CNC machines – which is best for you?**

A big misconception is that all educators need an industrial machine for their shop floors. Oftentimes a trainer will suit all your teaching needs with providing all necessary hands on experience on industrial CNC controllers such as latest Siemens and Fanuc controllers.

**Maintenance Cost:** Maintenance cost of the industrial production machines can be substantially higher than the trainer machines. Small maintenance issue can cause a large operational expenses which might end up in making these production machines sit idle on the shop floor.

**Operational Cost:** Industrial machines generally have higher capacities than the trainer machines which naturally need bigger workpieces as well as bigger tools / inserts. This increases the operational expenses which can act as a deterring factor to let all students have hands on experience on the machine.

Hytech CNC Machines are high quality, high precision CNC machines which can easily machine mild steel. Hytech CNC machines can definitely provide experience of industrial CNC machines without incurring the actual cost of procuring industrial production CNC machines.







## Why HYTECH Trainer Machines are better suited for Education

- **What table size / axes stroke do you really need for CNC Mill Machine?**

For CNC Mill machine, you want to be careful to select a table size and axes stroke that is appropriate for the size parts you plan to make, rather the size of the raw material that is easily available.

If the biggest part you plan to make is six inches or 150mm x 150mm, then you don't need to purchase a 1000mm table.

Generally, for educational purpose, optimum size of a raw job would be 100mm x 100mm or 150mm x 150mm. Rationale behind these dimensions is the operational cost involved as well as the are available for performing necessary operations. For this dimensions of raw jobs, optimum axes travel required are 300mm x 225mm x 250mm (X x Y x Z axes).

**Hytech machines are designed considering these factors and to provide optimum results with least possible operational expenses.**

- **What chuck size / axes stroke do you really need for CNC Lathe Machine?**

For CNC Lathe machines, the equation is much easier. Higher the chuck size, higher is the travel required of X axis and subsequently that of Z Axis.

For example, if the chuck size is 135 mm, maximum diameter of a solid job that you can hold is 33mm and that of a hollow job is 110mm. Naturally, the maximum X axis travel required is 120mm. There is no point in having a 135mm chuck and 200mm X axis travel. Similarly, there is no point in having a 200mm chuck size for 120mm X axis travel. Travel of Z axis is generally 1.5 to 2 times that of X axis travel. You have to clearly understand that any unnecessary increase in the travels of any axis or that of chuck will result in unnecessary increase in the cost.

Also, higher chuck size will demand higher job size. Higher job size will eventually result in higher operational cost for every job. Considering the machine life of 8 years, this operational cost can lead to be the decisive factor for machine selection.

**Hytech Machines are designed to offer necessary experience on all important functions of CNC turning machines with a raw job size of 25mm to 32mm diameter.**





### Why HYTECH Trainer Machines are better suited for Education

- **Ensure your machines are actually usable for students**

Industry standard CAM software can often be frustrating for students to learn – not to mention time intensive to teach.

Students as well as instructors are expected to understand and consider the machine constraints before developing a CAM program.

Students don't have the time required to learn exactly how to calculate the feed rate and spindle speed required for each different type of material they plan to cut. If they were to calculate these figures inaccurately when using a large industrial machine, they could accidentally break the tooling or even cut through the material and damage the machine – and the repairs could be costly.

Students have to understand this by doing trial – error operations which might require higher number of jobs for each student. Higher capacity machines can lead to higher breakdown time and eventually students might have to skip the whole trial – error procedure which will actually provide them with valuable hands on experience.

Having a machine of optimum size which has a capacity to machine both ferrous as well as non ferrous materials will encourage students to perform various experiments with different types of feed rates, spindle speeds as well as different types of cutting tools.

Hytech CNC machines are designed to make sure that students will not be intimidated to use the machine by providing all necessary safety precautions as well as guidance through software prompting.





### Why HYTECH Trainer Machines are better suited for Education

- **Ensure the safety of your students**

Think about your equipment users – your students. These are inexperienced machinists who likely won't have time in a class period or two to completely understand the safety precautions required for industrial equipment.

Hytech CNC Training machines are designed with students in mind. For example, if a student cuts too quickly through material, the machine is circuit protected and will automatically turn off. An industrial machine won't. If a student cuts too deeply or quickly into a material, he/she could potentially break the machine, requiring an expensive repair.

Ultimately, if you are teaching students about the various operations of CNC Machine, you don't need a huge industrial machine. Think about what happens when you teach someone to drive. Ferrari is definitely a very good car but would you allow your students to learn on a Ferrari or would you first teach them the basics of driving?

At the end, we all should all be making sure that students actually use CNC machines and don't only see the operations of it. Hands on experience on various functions of CNC machines such as tool offset, work offset, tool length compensation , auto tool change etc. is of utmost importance especially when these students go in industry seeking a job of a machinist.





## Hytech CNC Machines – CNC Lathe Training Machines

### CNC Lathe Training Machines

- CLT 100 – CNC Lathe Training Machine with Stepper Motors
- SLT 100 - CNC Lathe Training Machine with Servo Motors

### CNC Lathe Semiproduction Machines

- HPL 100 (With Fanuc / Siemens Industrial Controllers)





### Hytech CNC Machines – CNC Mill Training Machines

#### CNC Mill Training Machines

- MT 250 - CNC Mill Training Machine with Stepper Motors
- SPM 250 - CNC Mill Training Machine with Servo Motors

#### CNC Mill Semiproduction Machines

- SPM 250 (With Fanuc / Siemens Industrial Controllers)



### CNC Trainer Machines – Semiproduction Machines

Description	Trainer Machine	Semiproduction Machine
Machine Structure	FG 32 Grade Casting	FG 32 Grade Casting
Slide Movement	Dovetail Based	Linear Motion Guideways
Rapid Movement	Up to 5,000 mm/min	Up to 20,000 mm/min
Ball Screw	25 x 5 mm	32 x 5 mm
Controller Type	Incremental	Absolute
Controller	PLC and Computer Based	Industrial Controller (Fanuc / Siemens)
Operating Software	Cutviewer with emulation of Fanuc and Siemens	Fanuc / Siemens
Axes Motor Type	Incremental	Absolute
Spindle Motor	AC Induction Motor	AC Induction Motor / Digital Servo Motor
Turret for CNC Lathe	8 Station - Electromechanical	8 Station - Industrial Servo Type
Bellows	Fabric Based	Metallic Collapsible
Tooling	Brazed HSS	Solid Carbide
Materials that can be cut	Aluminum, MS (Light cut)	Aluminum, MS, SS



## Hytech Educational CNC Machines





**CNC Maintenance Training Kits**



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### What exactly is CNC Maintenance Training Kit?

- CNC Maintenance kits are designed to provide hands on experience to CNC operators or application engineers. Basic function of these kits is to experiment with the electrical panel as well as the ladder diagram of CNC machines. Participants are trained to solve most of the commonly occurring issues / problems in CNC controllers. It not only involves ladder design but also involves electrical circuit design and understanding. Basic arrangements are provided to distinguish three phase and single phase power supplies. It gives participants necessary confidence and basic understanding of the electrical control panel.
- Primary target of the CNC Maintenance Kits is to equip maintenance engineers and CNC operators with necessary skillset to resolve most of the recurring problems in CNC machines. Mechanical slides are also provided with maintenance kits which allow participants to have hands on experience with hardware related parameters.
- Complete operation manual is provided along with each maintenance training kit which is designed in collaboration with OEMs such as Fanuc and Siemens. Operating manual is designed in such a way that it will guide participants to understand the basic operation and maintenance parameters of CNC systems.
- Electrical panel is designed with completely isolated circuits for different operating voltages with color coded cables. Check points are provided to check the voltage at different checkpoints with proper safety precautions to avoid any accident.





## How is CNC Maintenance Training Kit different from CNC Training Machine?

- CNC Trainer machines provide training on CNC Machine operations. Students as well as instructors are not supposed to change the parameters as well as the ladder of a CNC machine
- All they can do is to operate the machine and raise an alarm if there is any issue in the machine operation. Out of 10 problems that a CNC machinist encounters, 9 can be solved very easily.
- Understanding the basic maintenance procedure can substantially reduce the machine breakdown time.
- CNC Operational training will never expose students to maintenance requirements of a machine.
- CNC maintenance training kit is designed in a way that basic parameters as well as control panel can be very easily accessed by students.
- Basic functions of CNC Controller such as calibration, control circuit design and checking, over travel limits, assigning i/o s, backlash compensation, referencing etc can be very easily practiced on CNC Maintenance training kits
- **The concept of CNC Maintenance kits is to make CNC operators confident about the basic CNC maintenance operations by providing hands on experience. At the end of this course, CNC operators are expected to solve more than 70% of recurring operational problems and to know the exact nature of at least 90% of operational problems.**



**Few of the experiments that can be carried out on maintenance kits**

- Taking System Backup
- Restoring System Backup
- Setting Backlash
- Limiting the speed of each axis
- Setting acceleration and deceleration for each servo axis
- Setting software limits
- Setting hardware limits
- Axis referencing
- Changing Servo Parameters
- Changing spindle parameters and incorporating encoder
- Understanding electrical circuit diagram and function of various electrical components used
- Basic single phase circuits
- Basic Three Phase circuits
- Understanding of basic components and bottle neck components (from CNC OEM such as Fanuc and Siemens)
- Dynamic updation of machine ladder diagram
- PLC ladder monitoring and understanding function of various input and output bits
- Understanding the electrical circuits of peripheral accessories
- Setting axis parameters for belt driven system, direct coupled system etc
- Setting spindle parameters for belt driven system, direct coupled system etc



## CNC Simulator (SIEMENS and FANUC)



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## FANUC CNC SIMULATORS

### Front Appearance

- Power on Switch
- Power off Switch
- Emergency Stop button
- Jog / Cutting feed override
- Manual pulse generator



- LED lamp indicator of alarm
- 10.4" Color display
- Horizontal & Vertical soft keys
- Full QWERTY Keyboard
- Machine control panel



## SIEMENS CNC SIMULATORS



### What is CNC Simulator?

- The CNC simulator is a perfect addition to the classroom and an essential component to gain maximum exposure to FANUC as well as SIEMENS CNC controls when actual machine time is limited. Based on the actual CNC Controller platform, the Fanuc simulator will allow you at power on to switch between milling and turning configurations to teach programming, navigation and operation on the world's most popular CNC control.
- Siemens CNC Simulator comes with two different simulators one each for turning and milling operations.
- Simple configurations make it easy to learn how to operate and edit data on a modern CNC (Siemens / FANUC) control. Conversational interface allows user to graphically generate programs that can be simulated in 3D, prior to being converted back to conventional NC programs to be used on machine tools using FANUC / Siemens controls.
- Uploading and downloading (read and punch) functions are facilitated by means of the standard Flash ATA interface and USB interface, and DNC functions are supported by Ethernet and Flash ATA card.



### What is CNC Simulator?

- Simulation of machining process for CNC training is significant considering its lower cost and risk free nature. Hardware CNC simulator is equipped with a CNC controller along with MPG, MOP as well as speed and feed override knobs.
- It gives an actual experience of machine operation to participants. Participants can take tool offsets, work offsets and execute the job on CNC simulators.
- The CNC simulator system is developed for simulation of multiple machining processes with risk free simulated process.
- Students get hands on experience on the actual CNC controller without the risk of any accident.
- Instructors can take this well designed simulator to a class room to make sure that students understand each and every function during their classroom sessions.



### Key Features of Fanuc Simulator:

- Switchable mill and lathe system in one simulator
- 3 axis milling / 2 axis turning system + 1 spindle
- Manual Guide i installed for conversational program creation and 3D simulation
- Inch / metric switchable
- 512kb part program storage, with 400 registered programs
- 32 Tool offset pairs
- Work piece coordinates G52 – G59 + 48 additional on mill
- 10.4" Color LCD
- Full QWERTY keyboard
- USB, Flash ATA and Ethernet connectivity
- Optional I/O link I and RS232 serial interface
- Power: AC 100 - 240, 0.8A – 0.4A, 50 – 60Hz
- Power consumption 80w
- Weight: Approx. 26.4lb (12KG)
- Dimensions: Approx. 16.5" x 7.5" x 23.3" (421mm x 190mm x 592mm)

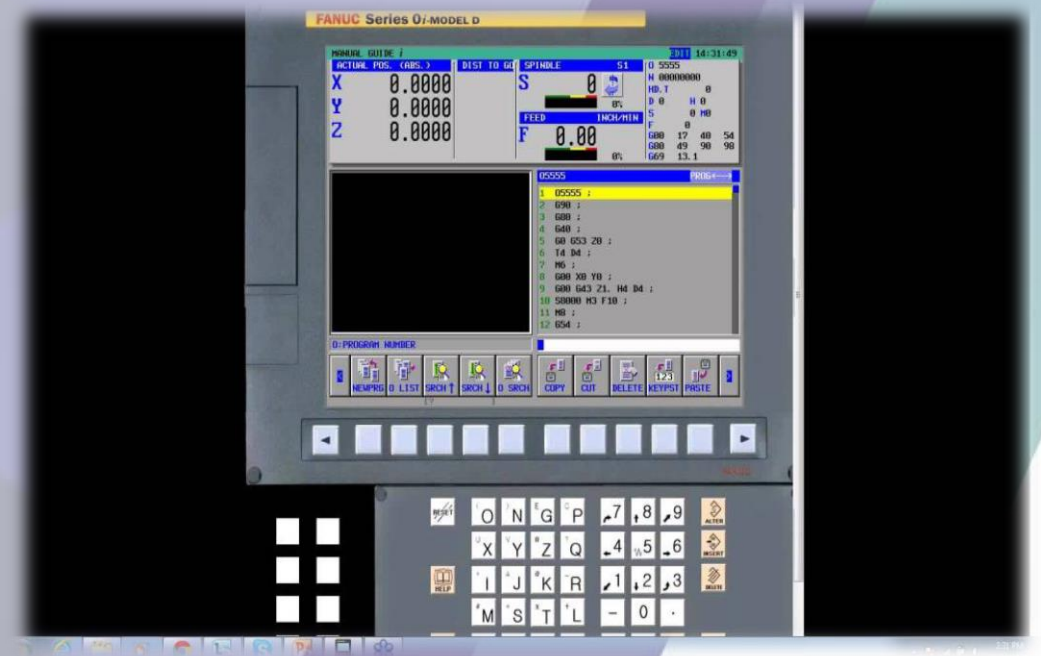


**What is Fanuc NC Guide software:**

NC Guide is a software developed and promoted by Fanuc. NC Guide software provides a screen which exactly represents Fanuc controller on a computer screen. Students can operate the Fanuc CNC controller on their computer screens which makes them aware about the various functions of Fanuc controller before they actually operate the CNC machine. Special academic price structure and a LAN based license makes this software affordable for even the smallest CNC training institutions which can provide training on world's most popular CNC controller using NC Guide software.

### Key Features of Fanuc NC Guide software:

- What you see on Fanuc Controller can be seen in NC Guide software on your personal computer
- Enables basic CNC screen displays for 31i Model-A and 0i-D series
- Enables how to operate the Fanuc CNC
- Creation and editing of Part Programs Tool offset and work offset entering and edit.
- Running and testing of program for syntax errors
- Entering and editing of Macro variables Editing of parameters
- Reviewing and clearing of messages and alarms
- Creation of part programs for lathe, machining centre and compound machines
- Tool Path graphic display





### Key Features of Fanuc NC Guide software:

- Display of finished component
- Cycle time estimation with simulation of programs
- Automatic conversion of conversational programs into conventional Gcode programs
- Hands on experience on Fanuc CNC systems
- Simulation of all Fanuc CNC controllers including Horizontal as well as Vertical machining Centers
- 3D Simulation of Finished / Programmed Component
- Automatic ISO Code generation
- Cycle time estimation
- 16 User License specially designed for Educational Purpose
- Programs from NC Guide software can be directly imported and executed on any Fanuc controller based machine





**CAD CAM EXPERT MODULE**

**'CAD – CAM EXPERT' module with CNC Hardware simulator:**

This is an additional module which can be installed along with any of the CIM layouts. This module provides hands on experience to students on CNC turning as well as Milling technology instructors can carry out CAD as well as CAM training right from scratch with this optional module.



Fanuc NC guide is a software which exactly replicates a Fanuc CNC controller screen on computer. Students execute the program on NC Guide software with complete 3D simulation. This gives them hands on experience on Fanuc operational functions such as job setting, tool offset, work offset, tool calling etc.

NC Guide license is a 16 user LAN based perpetual license. Ideally, batches of 16 students can perform the practical using NC Guide software.



Once student successfully executes the NC Guide and can perform the practical on the operating center.



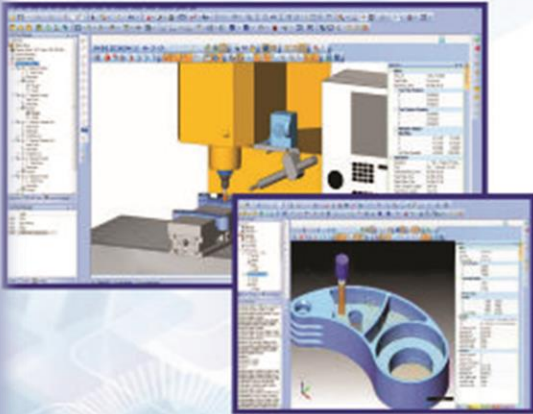
Once the program is successfully executed on NC Guide software, the same can be executed on Fanuc hardware simulator. Advantage of hardware simulator is that it gives an exact experience of Fanuc CNC controller so that students can get necessary confidence to operate the actual machine. Hardware simulator is equipped with Speed as well as Feed override along with all other functions available on Fanuc MDP. It is nothing but an actual Fanuc CNC without the machine.

As described earlier, 'CAD – CAM EXPERT' module focuses on CNC training which starts from 'Level 200' or 'from scratch'.

Students / participants first design a model in 3D on RobCAD software. They can design and simulate an entire machine on this software. Depending on the machine parameters, students can generate the NC codes from the RobCAD software and simulate the entire machining process.

The software is equipped with a NC code generation license which enables students to transfer the NC code (NC Program) on any suitable device (USB device / LAN network). These NC codes can be then imported in Fanuc NC Guide software.

The software (RobCAD CAM) is a version 31 / latest software which includes modules such as Turning, Milling, Boring etc.





### What is CAD CAM Expert Module:

'CAD – CAM EXPERT' module focuses on CNC training which starts from Level 'zero' or from scratch.

It consists of following equipment / software:

- **BOBCAD-CAM**

(3D Design and NC code Generation Software)

- **NC Guide**

(Fanuc Software for Fanuc CNC Control emulation)

- **Fanuc Simulator**

(Hardware Simulator from Fanuc which gives hands on experience on Fanuc CNC Controller)

- **CNC Turning Machine with Fanuc Controller**

- **CNC Milling Machine with Fanuc Controller**





**The Process:**

- Students / participants first design a model in 3D on BobCAD software. They can design and simulate an entire machine on this software. Depending on the machine parameters, students can generate the NC codes from the BobCAD software and simulate the entire machining process.
- The software is equipped with a NC code generation license which enables students to transfer the NC code (CNC Program) on any suitable device (USB device / LAN network). These NC codes can be then imported in Fanuc NC Guide software.
- Fanuc NC guide is a software which exactly replicates a Fanuc CNC controller screen on computer. Students execute the program on NC Guide software with complete 3D simulation. This gives them hands on experience on Fanuc operational functions such as job setting, tool offset, work offset, tool calling etc.
- Once the program is successfully executed on NC Guide software, the same can be executed on Fanuc hardware simulator. Advantage of hardware simulator is that it gives an exact experience of Fanuc CNC controller so that students can get necessary confidence to operate the actual machine. Hardware simulator is equipped with Speed as well as Feed override along with all other functions available on Fanuc MOP. It is nothing but an actual Fanuc CNC without the machine.
- Once students are confident after successful execution on Bob CAD-CAM, NC Guide and Fanuc hardware simulator; they can proceed for actual machining operation on CNC turning / CNC Milling centers.
- Once the actual machining process is completed on Turning / Milling centers, the entire process of design, NC code generation and machining can be termed as COMPLETE!





**Thank You!**

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