COURSE PROSPECTUS

Name of the Group: ***CAD/CAM***

Name of the Course: ***Certificate Program on CNC Machines and NC Part Programing***

Course Code: ***CAD 200***

Starting Dates **03rd July 2023**

Duration: ***4 Weeks – 100 Hours (@5 hours/day)***

Course Coordinator: *Rameshkumar MS, PTO, Mob: 9446031433*

Preamble: The Mechanical Industry is increasingly finding applications in all sectors of the economy and thus is accepted as a key enabler in development of our country. The current growth trend and its existing contribution to the global mechanical industry indicates that the share of Design and Manufacturing Industry in India, in terms of output and employment, has the potential to grow manifolds, driven by its emergence in the global manufacturing value chain.
In order to create a conducive environment for manufacture of high technology, and other high tech mechanical products, attract global investments as well as bridge the viability gap due to lack of adequate infrastructure and ecosystem, Government of India has announced number of initiatives in the country. To this aspect, there is also a need to ensure availability of trained human resources for this sector in order to sustain growth and to achieve the targets set for this sector.

Objective of the Course: The Certificate Program on CNC Machines and NC Part Programing aims to enable Mechanical/Production engineers/Diploma holders/ITI holders or working engineers in mechanical industries to learn programming and operation of CNC Machines. This is offered to bridge the major gap in competencies required to program & operate CNC machines. This course enables students to have industry oriented training on CNC machines.

Outcome of the Course: The participants will be able to understand:

- Fundamentals of NC/CNC
- NC Part Programming
- Conventional versus CNC Machine
- Tooling for NC/CNC
- Chucking, Turning Centres and Machining Centres
- Maintenance and Trouble Shooting of CNC Machine Tools

Expected Job Roles:

- CNC Programmer
- CNC Operator
- Technician - CNC

Course Structure:

Sl. No	Module Title	Duration (Hours)			Credits	
		Theory	Lab	Total	Theory (Hrs/15)	Lab (Hrs/30)
1.	Fundamentals of NC/CNC	2	3	5		
2.	NC Part Programming	10	60	70		
3.	Conventional versus CNC Machine	2	3	5		
4.	Tooling for NC/CNC	2	3	5		
5.	Chucking, Turning Centres and Machining Centres	1.5	3	4.5		
6.	Maintenance and Trouble Shooting of CNC Machine Tools	1.5	3	4.5		
7.	Internal Test	1	5	6		
	Total Duration/Credits	**20**	**80**	**100**	**4 (Theory 1 + Practical 3)**	

Other Contents

I. **Course Fees** : Course fee is Rs **12,000** including GST

Modular wise Course Fee: Not Applicable for this course

II. **Registration Fee:** An amount of Rs.1000/- (including all taxes as applicable) (nonrefundable) should be paid at the time of registering for the course.

This fee shall be considered as part of course fee, if the student joins the course. If a student register and pay for more than one course and join for any one course, all such amount will be adjusted against the course fee payable.

If the student does not join for the registered course/any of the registered courses, fee paid shall be forfeited.

However above the registration fee shall be refunded on few special cases as given below

- Course postponed and new date is not convenient for the student
- Course cancelled in advance, well before the admission date

III. Course Fee Installment Structure: Not Applicable for this course

IV. Eligibility: B.E/B.Tech or Diploma or ITI in Mechanical/Production/Automobile/Tool & Die/Mechatronics and allied branches (Final year students also may apply)

V. Number of Seats :12

VI. Selection of candidates : The candidates passed in the qualifying examination will be based on their marks obtained, subject to eligibility and availability of seats

VII. Test/Interview (*if applicable*) : *Not Applicable*

VIII. Counseling/Admission : Starting date of the course

IX. Important Dates (if applicable) :

Starting date:	**03.07.2023**
Last date to submit application form:	**28.06.2023**
Selection intimation in website:	**30.06.2023**
Counseling/Admission	**03.07.2023**
Commencement of class work:	**03.07.2023**
Payment of Fee	**03.07.2023**

X. Course Timings : 11:00 Hrs to 17:00 Hrs (Excl Saturdays, Sundays and National Holidays - 13:00 Hrs to 14:00 Hrs Lunch break

XI. Placement : Support shall be provided

XII. Lab Facilities

CNC Lathe: Ace CNC Lathe - Tutor with Fanuc Control (Fanuc Oi – TF), exclusively for hands on training.
CNC Milling: The Ace SPARK being one of the smallest vertical drill tap machining center and is compact, powerful and a perfect machine for any workshop, occupying an area of 1400*2150 mm*mm and height of 2500mm fitted with Fanuc Control (Fanuc Oi – MF).
Fully equipped air conditioned class room with LCD projector

XIII. Course Contents:

Course Brief – CAD200 Certificate Program on CNC Machines and NC Part Programing

The CNC course consists of the following sub modules:

- **Fundamentals of NC/CNC**

The term numerical control is a widely accepted and commonly used term in the machine tool industry. Numerical control enables an operator to communicate with the machine tools through a series of numbers and symbols, called part program. This chapter deals with the basic understanding of Numerical Control machine tools and the co-ordinate systems adopted for these machines

- **NC Part Programming**

Numerical control (NC) operates machine by sending a series of coded instructions consisting of alphabet letters, numbers, and symbols in language that machine control unit (MCU) can understand. The coded instructions or commands are listed in a logical sequence to have a machine tool to perform a specific task or a series of tasks in order to produce a machined part. Hence the NC machine user must have knowledge about NC the part programming in order produce a finished part by using NC or CNC machine.
This module covers NC part programming in detailed manner and gives more information about special machining cycles (e.g. canned cycles for all types of machining).

- **Conventional versus CNC Machine**

This module deals with the comparison and benefits of NC/CNC machine tools over conventional machines. It briefly describes the design considerations, constructional details of NC machine tools, DNC, CNC, and the advantages and disadvantages CNC over other machines

- **Tooling for NC/CNC**

Increased manufacturing speed and less tolerance errors has spawned the need for more efficient tool management. It's important to know where the tool is, how long it will last, and what the offsets are. In the past, operators kept track of these operating details manually. This module describes about cutting tool theory, Turning and milling tools, adaptive control and some latest developments in CNC tooling field like telltale tools etc

- **Chucking and Turning Centers**

Numerical controlled (NC) lathes had a very slow start in manufacturing. Studies during the 1960s indicated that 40 percent of all metal cutting operations were performed on lathes, yet NC lathe accounted for only 7.4 percent of the total NC sales at that time. These lathes were standard engine lathes had been retrofitted for NC. The term retrofit means fitting control systems and other required NC gear to a conventional piece of equipment

that was not originally designed for NC. These NC lathes were a significant improvement over the conventional and tracer lathes being used at that time. They were capable of making contour cuts by controlling the coordinated motion of the cross slide and the carriage. Thread cutting was made possible by the automatic synchronization of the spindle RPM and the travel of the carriage.

- **Machining Centres**

Machining centers are evolved from the need to be able to perform a variety of operations and machining sequences on a workpiece on a single machine in one set-up. Many parts require machining on several machines and may spend weeks on the shop floor waiting and moving from one machine to other machine.

Operations such as milling, contouring, drilling, counter boring, boring, spot facing, and tapping can now be performed on machining centers in any sequence and require only one set-up. Machining centers equipped with automatic tool changers, automatic pallet changers rotary tables, and rotary work heads make this a very versatile machining while reducing the operator intervention during the cutting cycle

- **Maintenance and Trouble Shooting of CNC Machine Tools**

Maintenance is war. Your enemies are the triumvirate of breakdown, deterioration, and all types of unplanned events. Your soldiers are the maintenance department and as many civilians as you can recruit. The civilians you protect are production workers, office workers, drivers, and all the other users of your organization's assets. This module gives you an overview about types of maintenance, CNC system & mechanical maintenance aspects

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