

AALIM MUHAMMED SALEGH COLLEGE OF ENGINEERING

DEPARTMENT OF MECHANICAL ENGINEERING

CIRCULAR

AMSCE/ME/VAC001/2020-2021

It is informed to all the students of Mechanical Engineering, it is proposed to conduct Value Added Courses on “**FUNDAMENTALS IN CNC PROGRAMMING**” (40 hours duration) offered in our campus **CAD/CAM LAB** that the course starts from 19.02.2021. Detailed Schedule along with information for taking up this Industry based courses are shared before the commencement of the program. All the students of Second year Mechanical Engineering are requested to follow the guidelines given to derive the maximum benefits from the resource person.

Note:

- *Safety rules and regulations must to be followed.
- *Minimum 80 % attendance mandatory to receive the certificates.
- *Assessment Test will be conducted at the end of session.

RESOURCE PERSON:

Er.A.Subash

CNC PROGRAMMER

I3 design Technologies-Chennai.


Head - Mechanical Engineering




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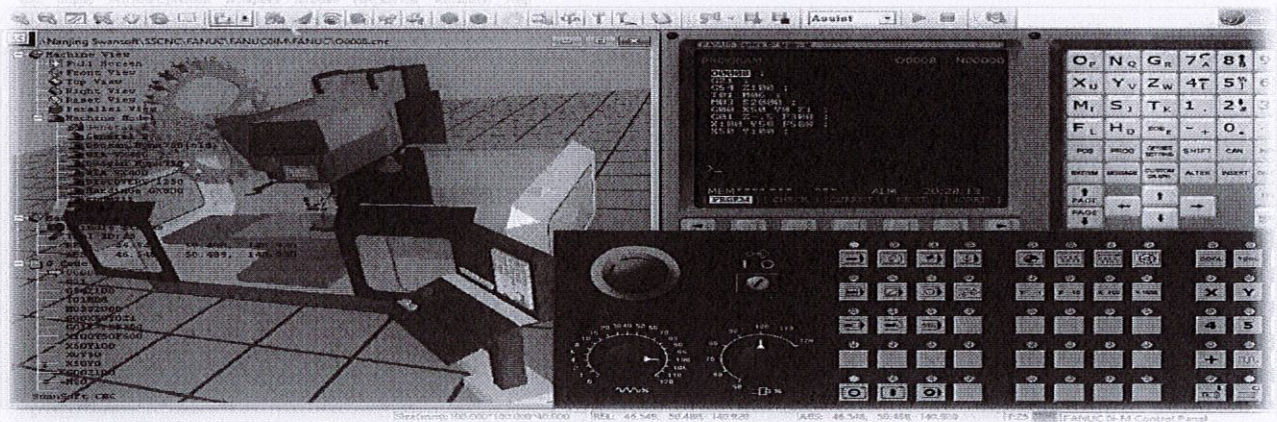


DEPARTMENT OF MECHANICAL ENGINEERING

*Organise
Value Added Course*

on

“Fundamentals in CNC Programming”



Course Details:

Resource Person:

Mr. A. Subash, CNC Programmer, i3 Design Technologies, Chennai.

Duration: 40Hrs

Course start: 19/02/2021 to 02/04/2021

Time: 2.00 pm to 5:00pm.

Venue: CAM Laboratory, Mechanical/Civil Block.

Contact (resource person): +91-9003298576

[Signature]
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Course Objectives:

- **Understanding CNC Programming Principles:** Provide participants with a comprehensive understanding of the fundamental principles of CNC (Computer Numerical Control) programming. This includes learning about CNC machine types, coordinate systems, and the basic commands and codes used in CNC programming. Participants will gain the foundational knowledge necessary to understand and write CNC programs.
- **Technical Proficiency in CNC Programming:** Develop practical skills in creating and optimizing CNC programs for various machining operations. Through hands-on training and exercises, participants will learn to program CNC machines for tasks such as milling, turning, and drilling. They will also understand how to troubleshoot and modify programs to improve efficiency and precision.
- **Application of CNC Programming in Real-World Scenarios:** Equip participants with the ability to apply CNC programming skills to real-world manufacturing scenarios. This includes learning to interpret technical drawings and specifications, selecting appropriate tools and materials, and ensuring adherence to safety and quality standards. Participants will gain experience through practical projects and case studies, enhancing their problem-solving and critical-thinking abilities in a CNC machining context.





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REPORT FOR THE VALUE ADDED COURSE ON A FUNDAMENTALS
IN CNC PROGRAMMING

Course Name: Fundamentals in CNC programming

Date: 19/02/2021 to 02/04/2021

Time: 2.00pm to 5.00pm

Course Hours: 40

Attended Students: 30

Students Certified: 30

Objectives:

CNC (Computer Numerical Control) is a technology that uses computers to control machine tools, automating the precise movement and operation of machines used in manufacturing processes. CNC is widely used in industries like automotive, aerospace, medical devices, and metalworking for its ability to produce highly accurate and repeatable parts.

1. CNC Machine Setup

- **Machine Types:** CNC machines come in various types, such as CNC mills, lathes, routers, grinders, and EDM (Electrical Discharge Machines), each designed for specific tasks.
- **Workpiece Setup:** The material (metal, plastic, wood, etc.) is securely placed on the machine's worktable or chuck. Fixtures or clamps are used to hold the material in place to avoid shifting during machining.
- **Tool Setup:** The machine is equipped with the required cutting tools, such as drills, end mills, or turning tools. The tools are loaded into the machine's tool changer or tool holder.

2. CAD (Computer-Aided Design)

- **Design Creation:** Before the CNC machining process begins, a part or component design is created using CAD software (like AutoCAD, SolidWorks, or Fusion 360). This digital model serves as the blueprint for the part.
- **Model Parameters:** The designer specifies dimensions, tolerances, and other details of the part in the CAD file.

3. CAM (Computer-Aided Manufacturing)

Toolpath Generation: Once the CAD design is complete, the model is imported into CAM software (such as Mastercam, Fusion 360, or Siemens NX). CAM software generates the



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toolpaths — the precise paths that the CNC machine's tool will follow during the machining process.

- **Simulation:** The software simulates the machining process to check for errors, tool collisions, and to ensure the toolpaths will produce the desired result.

4. G-Code Programming

- **Code Translation:** CAM software generates G-code, a standardized programming language that CNC machines can understand. G-code contains instructions such as:
 - **Movement commands** (G0: rapid positioning, G1: linear interpolation for cutting)
 - **Tool commands** (M06: tool change)
 - **Spindle and feedrate control** (S: spindle speed, F: feed rate)
 - **Coordinate commands** (G54: work coordinate system)
- **Manual Programming (if necessary):** For simpler tasks or adjustments, operators may write or edit G-code manually.

5. Machine Operation

- **Starting the Process:** The G-code program is loaded into the CNC machine, and the operator begins the machining cycle. The CNC machine reads the code and controls the movement of the tool along various axes (X, Y, Z, and sometimes additional axes such as A, B, and C for rotation).
- **Tool Movement:** The machine follows the specified toolpaths, controlling the tool's speed, position, and depth of cut. The operator monitors the process to ensure everything is going according to plan.

6. Cutting and Machining

- **Material Removal:** As the cutting tool moves through the material, it removes material to shape the workpiece into the desired form. This can include operations like drilling, turning, milling, grinding, or tapping.
- **Precision:** CNC machines are highly precise, often capable of tolerances within thousandths of an inch or micrometers, ensuring high-quality parts with repeatability.
- **Coolant:** Cutting tools often require lubrication or cooling during the machining process to prevent overheating and tool wear. Coolants are sprayed onto the workpiece during cutting.

7. Part Inspection

- **Measuring Tools:** After machining, the part is inspected for quality and precision. Common inspection tools include micrometers, calipers, CMMs (Coordinate Measuring Machines), and optical comparators.
- **Tolerance Check:** The final part must meet the specified tolerances defined in the original CAD design. Any deviations can lead to rejection of the part.

8. Post-Processing and Finishing

- **Deburring:** After machining, sharp edges may need to be smoothed using a deburring process.
- **Surface Finishing:** Depending on the part's requirements, additional processes like polishing, coating, or heat treatment might be applied for aesthetics, wear resistance, or mechanical properties.



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- **Assembly:** The finished parts may then be assembled into larger systems or products.

9. Advantages of CNC

- **Precision:** CNC machines offer high accuracy and repeatability, making them ideal for complex and tight-tolerance parts.
- **Automation:** CNC reduces the need for manual labor, increasing productivity and minimizing human error.
- **Complex Geometry:** CNC can create intricate shapes and designs that would be difficult or impossible to achieve manually.
- **Efficiency:** Multiple operations (drilling, milling, turning) can often be performed on a single CNC machine, reducing handling time and cost.


10. Challenges of CNC

- **High Initial Cost:** CNC machines and software can be expensive to purchase and set up.
- **Maintenance:** Regular maintenance is required to ensure machines remain in peak operating condition.
- **Skill Requirements:** Operating a CNC machine requires specialized knowledge and training in both programming and machine setup.

Conclusion

CNC technology has revolutionized the manufacturing industry by enabling high-precision, efficient, and automated production of complex parts. Understanding the basics of the CNC process—from design and programming to machining and finishing—can help operators optimize production and achieve superior results.




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From

Date: 10/02/2021

The Head of the Department
Department of Mechanical Engineering,
Aalim Muhammed Salegh college of Engineering,
Muthapudupet, Avadi, I.A.F.,
Chennai- 600 055.

To

The Principal,
Aalim Muhammed Salegh college of Engg.
Muthapudupet, Avadi I.A.F.,
Chennai - 600 055.

Sub: Requisition for the Approval to conduct Value Added Course
in Mechanical department - Regarding.

Respected Sir,


We would like to conduct a Value Added Course on the title “**Fundamentals in CNC Programming**” for second year mechanical students by the resource person Mr. A. Subash, CNC Programmer, i3 Design Technologies, Chennai, who will be leading the course. The scheduled date for the value added course is from 19/02/2021 to 02/04/2021 We kindly request you to provide approval for the same.


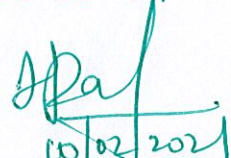
Thanking you

Yours Faithfully


10/2/2021
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10/02/2021



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DEPARTMENT OF MECHANICAL ENGINEERING

Value Added Course Details




Course Name: Fundamentals in CNC Programming 19-02-2021 to 02-04-2021

Time 2.00 pm to 5.00 pm

Week	Content	Total Hours
1	Module-1 <ul style="list-style-type: none">• Introduction to Computer Numerical Control (CNC)• Numerical control• Concept of numerical control• Advantages of CNC• Classification of CNC Machine Tools• Features Of CNC Machining Centers	9
2	Module-2 <ul style="list-style-type: none">• Blue print reading Reading the machining sketches• Different Geometrical Tolerance symbols• Reading Dimensional Tolerances• Understanding the Views	9
3	Module-3 <ul style="list-style-type: none">• Auto CAD basic (ACAD-01)• Sketching Points line, Circles & Arcs. S• Simple exercises based on above• Isometric Views	9
4	Module-4 <ul style="list-style-type: none">• Introduction to milling machine• & its parts• Different operations of milling.• Knowledge of different cutting tool materials used• Selecting speed feeds• & depth of cut	13
Total Hours		40




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DEPARTMENT OF MECHANICAL ENGINEERING

VALUE ADDED COURSE - FUNDAMENTALS IN CNC PROGRAMMING - SCHEDULE

DEPARTMENT: Mechanical Engineering

BATCH: 2018-2022

S.NO	DATE	TIME	VENUE
1	19-02-2021	02:00 PM - 05:00 PM	CAD - CAM LAB
2	23-02-2021	02:00 PM - 05:00 PM	CAD - CAM LAB
3	26-02-2021	02:00 PM - 05:00 PM	CAD - CAM LAB
4	02-03-2021	02:00 PM - 05:00 PM	CAD - CAM LAB
5	05-03-2021	02:00 PM - 05:00 PM	CAD - CAM LAB
6	09-03-2021	02:00 PM - 05:00 PM	CAD - CAM LAB
7	12-03-2021	02:00 PM - 05:00 PM	CAD - CAM LAB
8	16-03-2021	02:00 PM - 05:00 PM	CAD - CAM LAB
9	19-03-2021	02:00 PM - 05:00 PM	CAD - CAM LAB
10	23-03-2021	02:00 PM - 05:00 PM	CAD - CAM LAB
11	26-03-2021	02:00 PM - 05:00 PM	CAD - CAM LAB
12	30-03-2021	02:00 PM - 05:00 PM	CAD - CAM LAB
13	02-04-2021	02:00 PM - 06:00 PM	CAD - CAM LAB

Total Conducted Hours: 40

Sathish
19/02/2021
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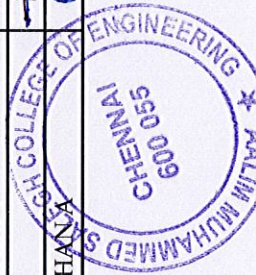
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DEPARTMENT OF MECHANICAL ENGINEERING
COURSE ON "FUNDAMENTAL IN CNC PROGRAMMING"

STUDENTS ATTENDANCE LIST

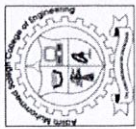
COURSE INSTRUCTOR: MR. A. SUBASH

REG NO	NAME	19.2.21	23.2.21	26.2.21	02.3.21	05.3.21	09.3.21	12.3.21
110118114008	AKASH R	Akash	Akash	Akash	Akash	Akash	Akash	Akash
110118114009	ASMATH SHAFEE S	asmath	asmath	asmath	asmath	asmath	asmath	asmath
110118114012	FARVES MUSHRAF. M.S	Farves	Farves	Farves	Farves	Farves	Farves	Farves
110118114013	HAFAEZULLAH KHAN R	Haafez	Haafez	Haafez	Haafez	Haafez	Haafez	Haafez
110118114018	MAHMOOTH NAFIL .U	Nafil	Nafil	Nafil	Nafil	Nafil	Nafil	Nafil
110118114021	MOHAMED AL HAFEES.M	HM	HM	HM	HM	HM	HM	HM
110118114022	MOHAMED AYAS.M	AY	AY	AY	AY	AY	AY	AY
110118114026	MOHAMED RIFAIZ SYED IBRAHIM	Ibrahim	Ibrahim	Ibrahim	Ibrahim	Ibrahim	Ibrahim	Ibrahim
110118114027	MOHAMED SALMAN FARZI	Salman	Salman	Salman	Salman	Salman	Salman	Salman
110118114028	MOHAMED SHA KAJA JAVITH M	Kajal	Kajal	Kajal	Kajal	Kajal	Kajal	Kajal
110118114031	MOHAMMED AADHIL SHARIFF I	Aadhil	Aadhil	Aadhil	Aadhil	Aadhil	Aadhil	Aadhil
110118114038	MOHAMMED IRFAN M	Irfan	Irfan	Irfan	Irfan	Irfan	Irfan	Irfan
110118114039	MOHAMMED IRFAN M	Irfan	Irfan	Irfan	Irfan	Irfan	Irfan	Irfan
110118114040	MOHAMMED RASHEED.B	Rasheed	Rasheed	Rasheed	Rasheed	Rasheed	Rasheed	Rasheed
110118114041	MOHAMMED TAWFEEQ NASAR	Nasar	Nasar	Nasar	Nasar	Nasar	Nasar	Nasar
110118114042	MUHAMMED MUSHARRAF ALI S M B	Mushraf	Mushraf	Mushraf	Mushraf	Mushraf	Mushraf	Mushraf
110118114047	SADHAM HUSSAIN MA.A	Sadham	Sadham	Sadham	Sadham	Sadham	Sadham	Sadham
110118114048	SEYED ABUBACKER MI	Sayed	Sayed	Sayed	Sayed	Sayed	Sayed	Sayed
110118114051	SHAIK ZAMEER HUSSAIN.S	Shaikh	Shaikh	Shaikh	Shaikh	Shaikh	Shaikh	Shaikh
110118114053	SHOIAB KHAN.A	Shoiab	Shoiab	Shoiab	Shoiab	Shoiab	Shoiab	Shoiab
110118114056	SYED RAZA ALI.S.N	Syed	Syed	Syed	Syed	Syed	Syed	Syed
110118114058	ZARAR AHAMED.A	Zarar	Zarar	Zarar	Zarar	Zarar	Zarar	Zarar
110118114059	ZIAUL FAYAZ.Z	Ziaul	Ziaul	Ziaul	Ziaul	Ziaul	Ziaul	Ziaul
110118114303	KADHER MOHIDEEN M	Kadher	Kadher	Kadher	Kadher	Kadher	Kadher	Kadher
110118114305	MOHAMED AL IMRAN	Al	Al	Al	Al	Al	Al	Al
110118114306	MOHAMED ASLAM M	Aslam	Aslam	Aslam	Aslam	Aslam	Aslam	Aslam
110118114307	MOHAMED IMRAN A W	Imran	Imran	Imran	Imran	Imran	Imran	Imran
110118114308	MOHAMMED IBRAHIM T	Ibrahim	Ibrahim	Ibrahim	Ibrahim	Ibrahim	Ibrahim	Ibrahim
110118114311	SHAIKH FAHAD	Fahad	Fahad	Fahad	Fahad	Fahad	Fahad	Fahad
110118114701	AHAMED RIYAJ KHANA	Riyaj	Riyaj	Riyaj	Riyaj	Riyaj	Riyaj	Riyaj



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DEPARTMENT OF MECHANICAL ENGINEERING
COURSE ON "FUNDAMENTAL IN CNC PROGRAMMING"

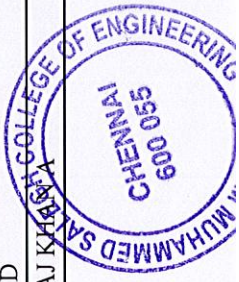


STUDENTS ATTENDANCE LIST

COURSE INSTRUCTOR:

REG NO	NAME	16/3/21	19/3/21	23/3/21	26/3/21	30/3/21	02/4/21
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110118114022	MOHAMED AYAS.M	AB	Maam	Maam	Maam	Maam	Maam
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110118114027	MOHAMED SALMAN FARZI	Maam	Maam	Maam	Maam	Maam	Maam
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110118114701	AHAMED RIYAJ KHAN	Riyaj	Riyaj	Riyaj	Riyaj	Riyaj	Riyaj

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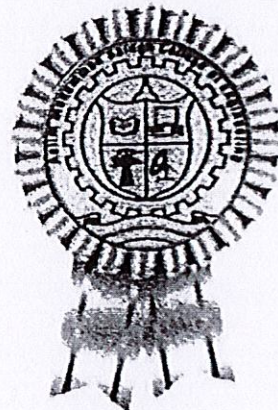
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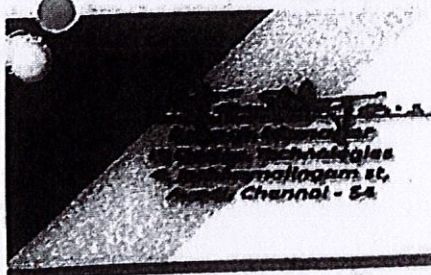
THIS CERTIFICATE IS PROUDLY PRESENT TO

SYED ARUBACKER M T

In acknowledgement for completion of Value Added Course entitled "FUNDAMENTALS IN CNC PROGRAMMING" organized by the Department of Mechanical Engineering held at Aalim Muhammed Salegh College of Engineering.



DATE: 09-APRIL-2021



CO. OFFICER
Dept. of Mechanical Engineering
AMS College of Engineering
Avadi, Chennai - 63

NOD
Dept. of Mechanical Engineering
AMS College of Engineering
Avadi, Chennai - 63



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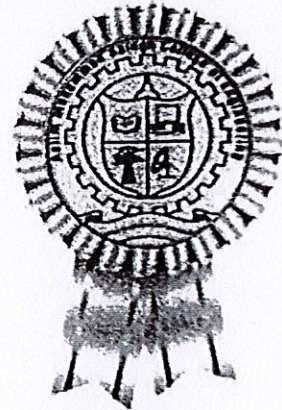
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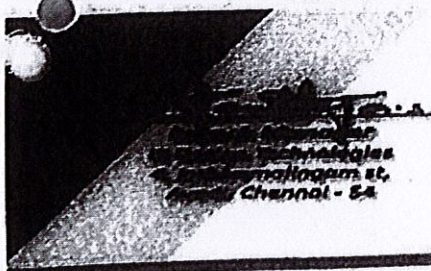
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ZAMEER HUSSAIN. S

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DATE: 09-APRIL-2021



P. M. S.
CO - ASSISTANT
Dept. of Mechanical Engineering
AMS College of Engineering
Avadi, Chennai - 63

N. S.
Dept. of Mechanical Engineering
AMS College of Engineering
Avadi, Chennai - 63



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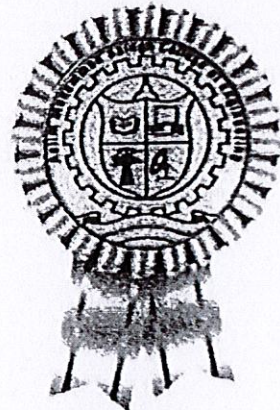
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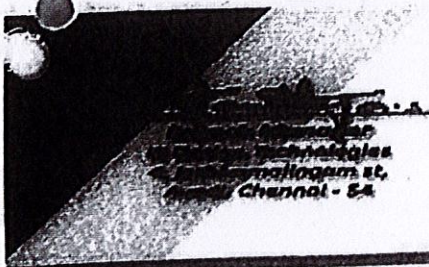
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MOHAMMED IRFAN M


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MOD
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AMS College of Engineering
Avadi, Chennai - 83




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