ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

Shobhavan Campus, Mijar, Moodbidri - 574225
(Affiliated to Visvesvaraya Technological University, Belagavi
Approved by AICTE, New Delhi & Recognized by Government of Karnataka)

A Report on

"COMPUTER NUMERICAL CONTROL LAB (CNC LAB)"

Department of Mechanical Engineering

Contents

COMPUTER NUMERICAL CONTROL LAB (CNC LAB)

Vision, Mission and Objectives of the Lab

Vision: To impart the knowledge of key manufacturing technologies and their underlying principles applied in current manufacturing industry.

Mission:

- To create a work environment that fosters creativity, passion in all individuals.
- Promote eco friendliness & to be exceptionally student centric to help to accomplish their goals.
- To be a part of nation building by technological advancements & by creating a highly skilled workforce.

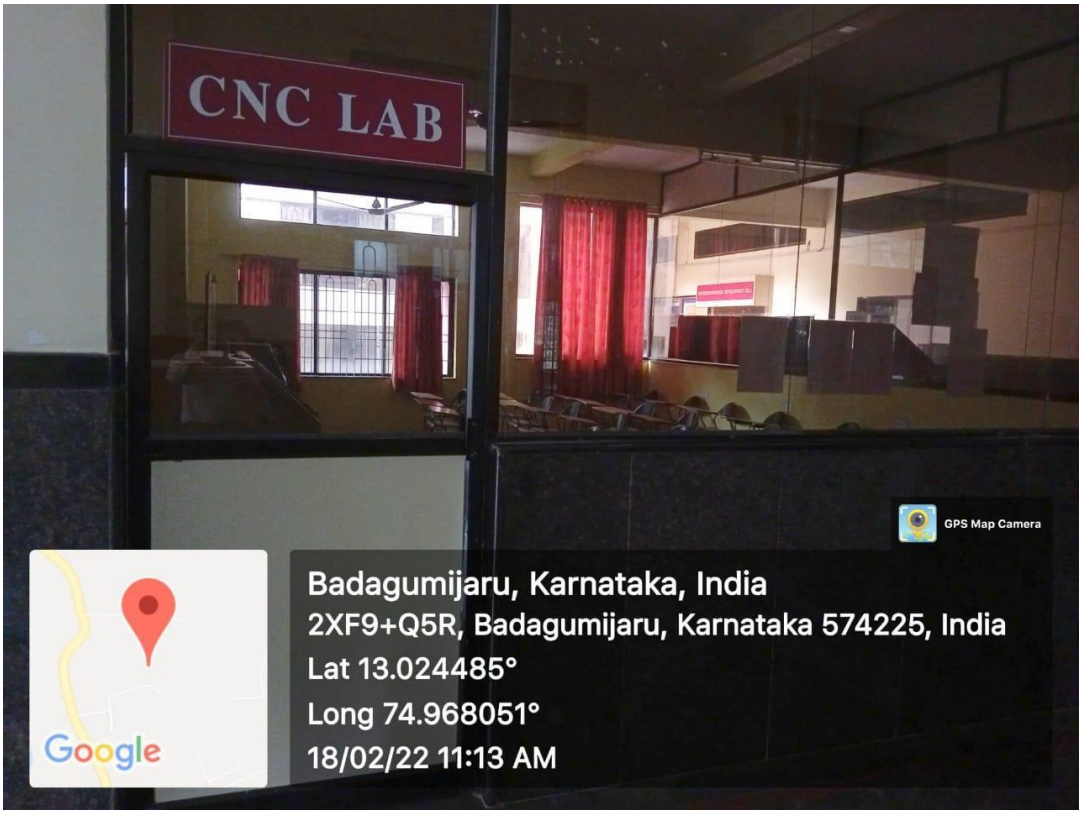
Objectives: To provide students with knowledge and hands-on experience in the area of Computer Integrated Manufacturing and consider the emerging research and development in the area of manufacturing segment in the industrial fraternity.

Faculty Coordinators:

Mr. Hemanth Suvarna, Senior Assistant Professor, Department of Mechanical Engineering

Mr. Pramod Kumar N, Assistant Professor, Department of Mechanical Engineering

The lab was established in the year **2013-14.** Lab consists of one state of the art CNC turning trainer machine & one CNC milling trainer machine.In addition, it is aimed at to demonstrate and understand the importance of automation and its predominant role in the assembly line of shop floor, so that to satisfy the need of agile manufacturing to meet the urging need of global competitiveness of upcoming industries.



CNC LAB

CNC programming theory session for students

CNC programming practical session for students

The objective of the CIM laboratory is to prepare the students industry ready and to acquire employability skills with the CNC programming and cutting tool path generation through CNC simulation software by using G-Codes and M-codes. Main purpose of this lab is to familiarize programming techniques in CNC part programming through the high end industry software such as CADEM Software Packages. Students will get familiarize about CNC Lathe part programming for Turning, Facing, Chamfering, Grooving, Step turning, Taper turning, Circular interpolation, Combination of few operations followed by CNC Mill Part programming for Point to point motions, Line motions, Circular interpolation, Contour motion, Pocket milling-circular, rectangular, Mirror commands in addition part programming using Canned Cycles for Drilling, Peck drilling, Boring, Tapping, Turning, Facing, Taper turning Thread cutting and Simulation of Tool Path for different operations Machining of small components using CNC Lathe & CNC Milling Machine.

Students operating CNC during the Training session

This CNC training facility is also further used to train Diploma/ ITI students from rural background. Apart from training our regular UG students our institute conducts workshops for Diploma/ ITI students which will improve the employability in those students.

CNC LAB SPECIFICATION - HYTECH CNC TRAINING KIT SUPPLIED BY HYTECH AUTOMATION PUNE.

CNC TURNING MACHINE (2 AXIS)

	CLT 100
	Machine Details:
Bed Type	Flat / 45 Degrees Slant
Keyboard Type	Fanuc Emulated / Standard
Chuck Size	100 mm (Dia)
Chuck Type	Hydraulic / Manual
Maximum Turning Diameter	50 mm
Maximum Turning Length	250 mm
Center Height	100 mm
Swing over Cross Slide	80 mm
Swing Over Bed	200 mm
Distance between Centre	320 mm
	CNC Controller Details:
Controller	CutViewer-United Kingdom with Emulation of Fanuc, Siemens , Traub and Heidenhain
Control System	PLC Based Control System
Operating Software	CutViewer - United Kingdom
	Accuracy:
Positioning	0.010 mm
Repeatability	+- 0.015 mm
Resolution	0.010 mm
	Spindle:
Spindle Motor	AC Motor
Spindle Motor Capacity	2 HP
Spindle RPM	100 to 3000 RPM with VFD
Spindle Nose Taper	A 2-3 / MT 3
Hole Through Spindle	20 mm
C Axis (Optional)	C Axis with Brake
	Axes
Axis Motor and Drive	Stepper Motor with Stepper Drives imported from Singapore
X Axis Travel	100 mm
Z Axis Travel	280 mm
Ball Screw X / Z	Ø25 x 5 - C4 Class
Feed Rate	0 to 1,200 mm/min
Rapid Travel	1,200 mm/min
	Turret and Tooling:
Turret Type	Automatic
Number of Stations	8
Tool Cross Section	16 mm x 16 mm
Boring Bar Size	16 mm
	Tailstock:
Tailstock Base Stroke	200 mm
Tailstock Quill Stroke	100 mm
Tailstock Actuation	Hydraulic / Manual / Electrical
	Miscellaneous:
Lubrication	Automatic
Coolant	Automatic
FMS Compatibility	Provided
Real Time Toolpath Simulation	Provided
Dimension in mm	1480 x 800 x 1200 mm
Power Supply	230V, Single Phase

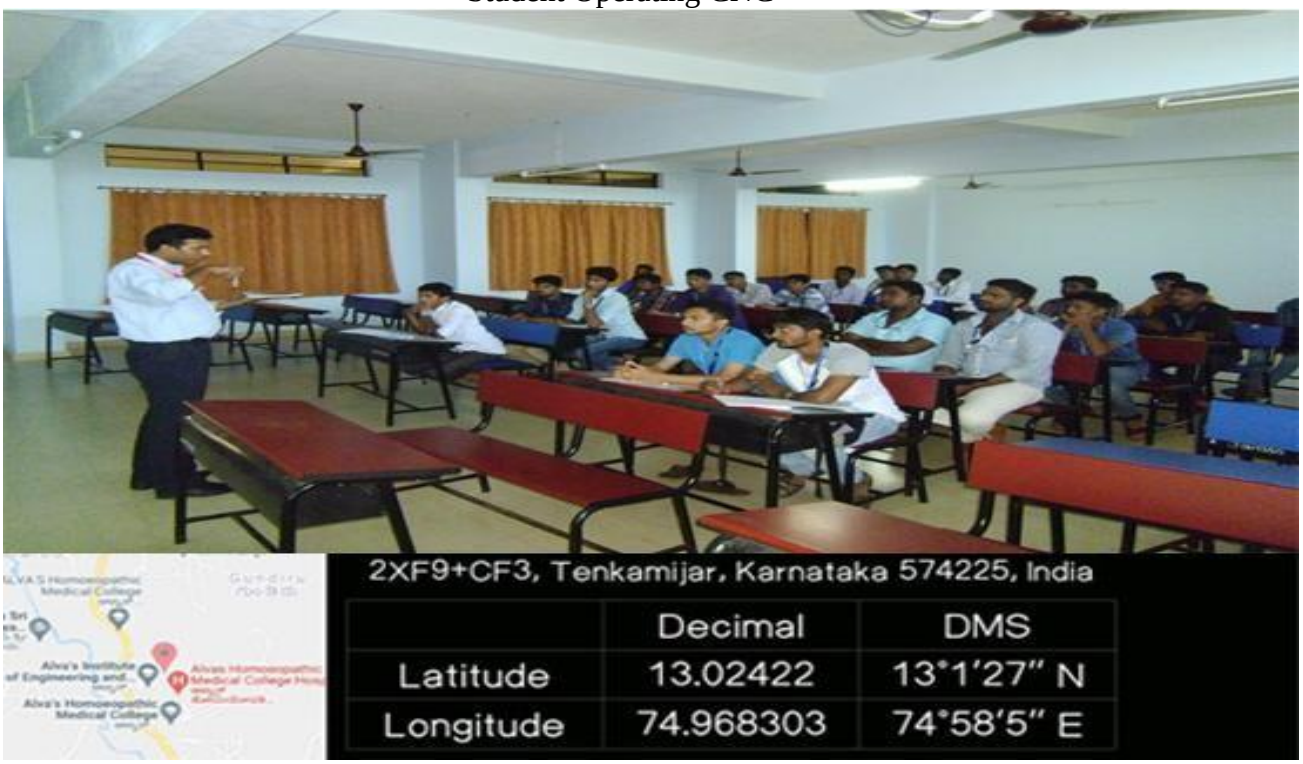
Table: CNC Turning Specifications

CNC MILLING MACHINE (3AXIS)

	MT 250
	Axis
Axis Motor and Drive	Servo Motor with Servo Drives
X Axis	300 mm
Y Axis	225mm
Z Axis	250mm
Ball Screw X / Y / Z	Ø25 x 5 - C4 Class
4th Axis Provision (Optional)	Provided
Distance between Table top and Spindle Nose	70 - 370 mm
Distance between Spindle to Column	270 mm
Feed Rate	0 to 1,200 mm/min
Rapid Travel	0 to 1,200 mm/min
	Table
Table Size	600 X 160 mm
T Slot	3 x 10 x 50
Load On Table	120 Kg
	Spindle
Spindle Motor Capacity	2 HP
Motor Type	AC Motor with VFD
Spindle Nose Taper	ISO 30 / BT 30
Spindle RPM	100 to 3000 RPM
	CNC Controller Details:
Controller	CutViewer-United Kingdom with Emulation of Fanuc, Siemens , Traub and Heidenhain
Control System	PLC Based Control System
Operating Software	CutViewer - United Kingdom
Keyboard Type	Fanuc Emulated / Standard
	Accuracy
Positioning	0.015 mm
Repeatability	+- 0.010 mm
Resolution	0.010 mm
4th Axis Resolution (Optional)	0.02 Degrees
	Tool Changer (ATC)
Tool Changer	Automatic
No. of Tools	8
Maximum Tool Length	40 mm
Maximum Tool Dia.	16 mm
Type of ATC	Umbrella Type
Actuation	Pneumatic / Hydraulic
	Machine Details
Run Speed Control	Computer Controlled with Software
Real Time tool path simulation	Provided
Vice Type	Pneumatic/ Manual
Compatible Softwares	MasterCAM, EDGE CAM, Solid Edge, BobCAD
Dimension in mm	1540 x 1200 x 1700 mm
Power Supply	230V, Single Phase

Table: CNC Milling Specification

Student Operating CNC



Mr. Hemanth Suvarna explaining the CNC concepts

Students Operating the CNC Machines

Students Operating the CNC Machine

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Mob:722262724,7026262725,mail:principalaiet08@gmail.com

Date -24/07/23

To

IQAC Chairman

AIET, Mijar

Respected Sir

Sub: Requesting for permission conduct a Workshop

We are happy to inform you that Department of Mechanical Engineering, is planning to organize one day Workshop titled INTRODUCTION TO CNC TURNING & MILLING on 26/07/2023 for First year Mechanical Engineering & Agriculture Engineering students

The details are mentioned below, kindly request you do the needful.

Workshop details

Name: **Mr. Hemanth Suvarna & Mr. Pramod Kumar N**

Title : **INTRODUCTION TO CNC TURNING & MILLING**

Venue: **CNC CENTRE (MECH BLOCK)**

Date/month/year: **26/07/2023**

Mode : **Offline**

HOD 24/7/2023

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Alva's Institute of Engg. & Technology,
Mijar, MOODBIDRI - 574 225, D.K

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aiet/Mech/AY2022-23/023 Date-24/07/23

Circular

All the First year students from Department of Mechanical Engineering,& Department of Agriculture Department are hereby informed to attend the one day workshop on CNC machines titled " INTRODUCTION TO CNC TURNING & MILLING"

Details are as following

Date: 26/07/2023

Time: 09:00 am-05:00 pm

Title of the Talk:" INTRODUCTION TO CNC TURNING & MILLING"

Venue : CNC WORK CENTRE ,

HOD - 24/7/23

Principal
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Alva's Institute of Engg. & Technology,
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Copy to

Principal table/Deans/HODs/AO/Office/---

One Day Workshop On Introduction To CNC Turning And Milling Workshop

Introduction:

The Mechanical Department of Alva's Institute of Engineering and Technology organized a comprehensive one-day workshop titled "Introduction to CNC Turning and Milling" on July 26, 2023. The workshop aimed to provide students with a solid foundation in CNC machining principles and practices, enabling them to become industry-ready and proficient in modern manufacturing techniques.The event commenced at 8:30 AM with an inaugural ceremony, graced by the presence of esteemed faculty members,and students. The Head of the Mechanical Department delivered a warm welcome address, highlighting the significance of CNC technology in today's manufacturing landscape and its potential to revolutionize the industry.

Machining and Conventional Manufacturing

Session 1: Machining and Conventional Manufacturing

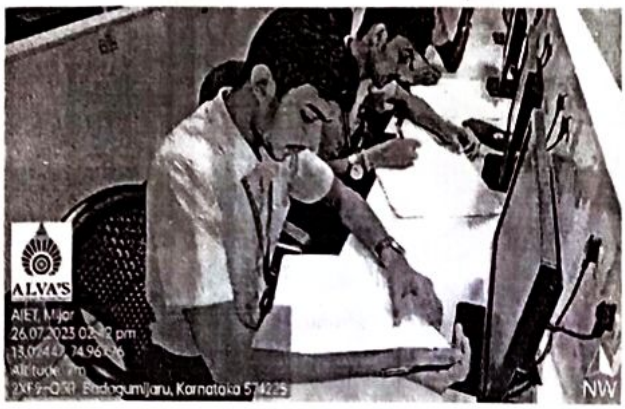
The first technical session began at 9:00 AM, where an experienced industry expert shed light on the history and evolution of machining processes. The participants were introduced to traditional manufacturing methods, such as turning, milling, drilling, and grinding. The expert emphasized the limitations of conventional techniques and how CNC machining addresses these challenges with enhanced precision, efficiency, and flexibility.

Session 2: Understanding CNC Machines

Following the insightful introduction to machining, the renowned in-house Trainer, Prof. Hemanth Suvarna, took center stage to delve into the world of CNC machines. Prof. Suvarna, with his extensive expertise, elucidated the essential components of CNC machines, including the control unit, motors, tool turret, and workholding devices. He demonstrated the functioning of CNC machines with engaging visuals and real-life examples, captivating the audience's attention and curiosity.

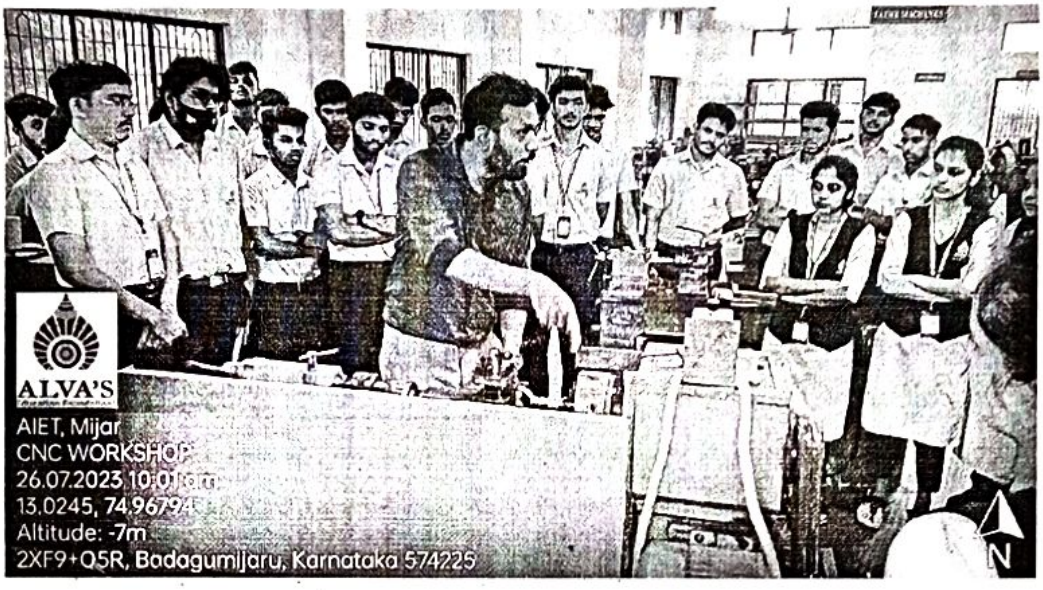
Interactive Q&A Session:

After each technical session, interactive question and answer sessions were held, allowing participants to seek clarifications and engage in meaningful discussions. This segment fostered an atmosphere of active learning and encouraged students to clarify doubts and deepen tneir understanding of CNC machining concepts.



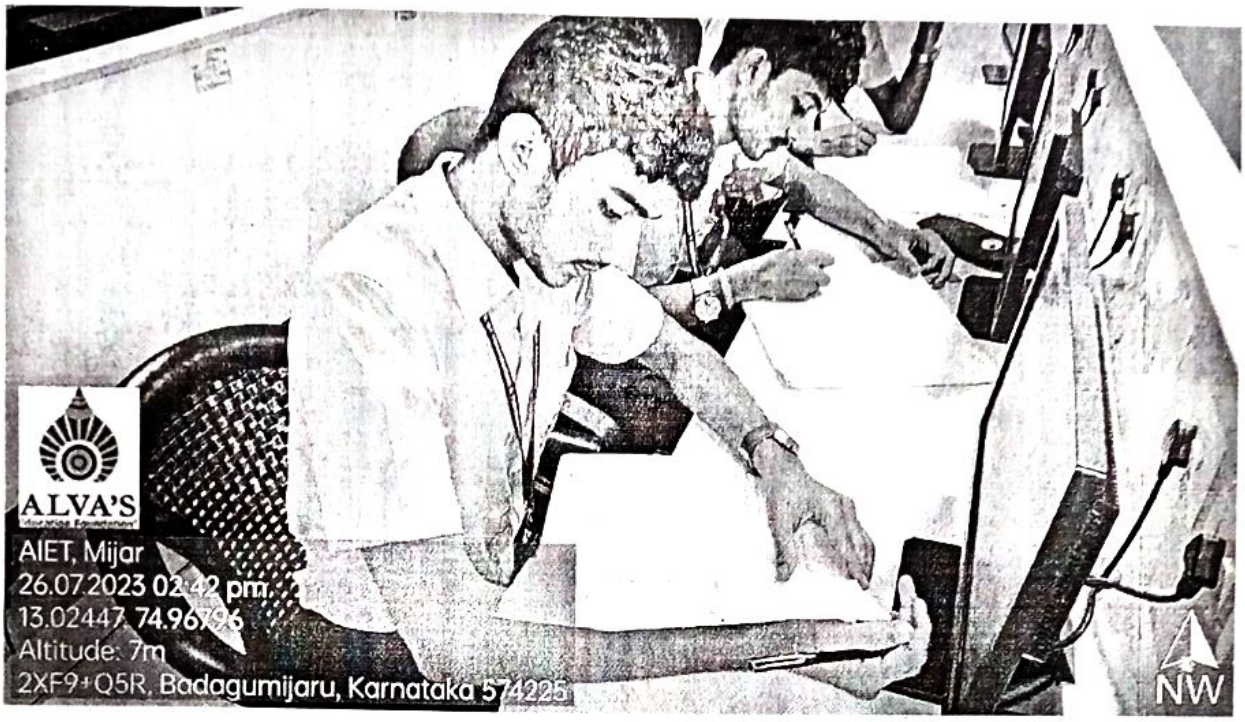
Session 3: Part Programming

Post a brief refreshment break, the afternoon session commenced with Prof. Pramod Kumar N leading an in-depth discussion on part programming for CNC machines. Prof. Kumar, a seasoned programmer and industry practitioner, imparted the fundamentals of G-code programming, explaining the syntax, commands, and logical sequence required to control CNC machines effectively. He also demonstrated the use of computer-aided manufacturing (CAM) software and simulation tools for accurate part visualization and error detection.



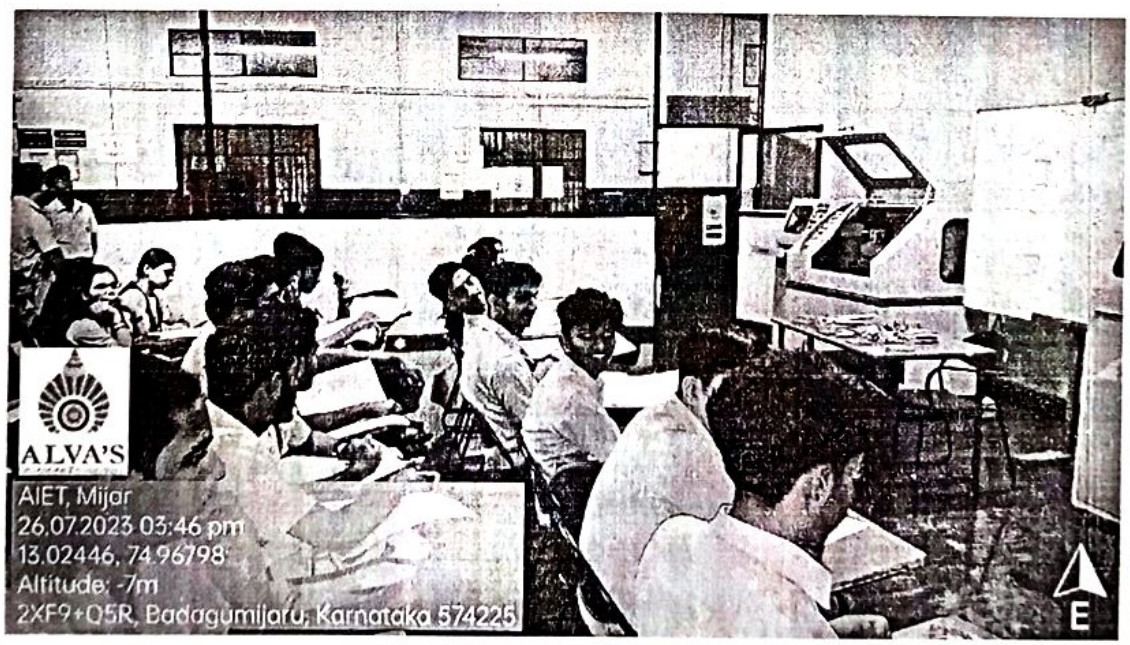
Session 4: CNC Hands-on Training

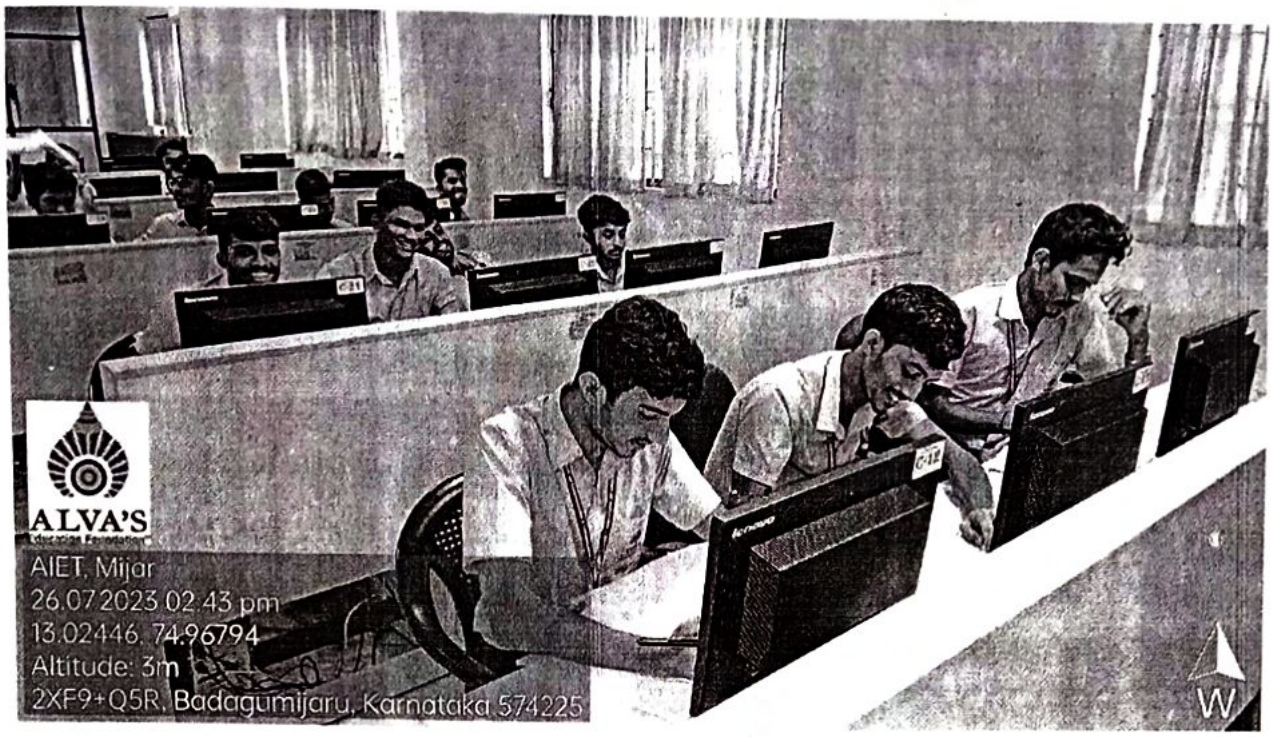
The highlight of the workshop was the hands-on training session, where the students had the unique opportunity to work with CNC machines themselves. Under the watchful guidance of Prof. Pramod Kumar N, the participants learned how to set up workpieces, align tools, and execute pre-programmed tasks. They experienced firsthand the intricacies of material removal, tool changes, and machine adjustments, gaining invaluable practical insights.



Industry Perspectives and Guest Speaker Talk:

To provide a broader outlook, a distinguished guest speaker from the manufacturing industry was invited to share insights into the current trends and challenges faced by CNC machining in the real-world scenario. The speaker emphasized the importance of skilled technicians in driving manufacturing efficiency and competitiveness.The workshop concluded with a valedictory ceremony, where certificates of participation were distributed to all attendees. The Head of the Mechanical Department expressed gratitude to the trainers, speakers, and participants for their active involvement and dedication. The participants shared their feedback, expressing their appreciation for the informative and engaging workshop that enriched their knowledge and skillset.





Conclusion:

The "Introduction to CNC Turning and Milling" workshop at Alva's Institute of Engineering and Technology was a resounding success, achieving its objectives of providing students with theoretical knowledge, practical experience, and industry insights in CNC machining. The event not only contributed to the personal and professional growth of the participants but also strengthened the institute's reputation for academic excellence and industry-oriented learning. The workshop's impact is expected to resonate positively with the students' future careers in the dynamic world of manufacturing and technology.

27/7/2023

Workshop Coordinators

27/7/2023

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Dept. Of Mechanical Engineering
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

*****

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One Day Workshop -Introduction To CNC Turning And Milling Workshop

Sl.No.	BRANCH	NAME	9AM -1PM	2PM -4PM
1	4AL22AG001	AKSHATA GANGADHAR SUNKAD		
2	4AL22AG002	DEEPAK J		
3	4AL22AG003	DEEPIKA Y		
4	4AL22AG004	ESHA S	Esha	Esha
5	4AL22AG005	GURUPRASAD N		
6	4AL22AG006	KASTURI C		
7	4AL22AG007	M B KRUPA		
8	4AL22AG008	N HARIYANTH KUMAR		
9	4AL22AG009	NAVEEN NAYAK	Naveen. Nayak	Naveen. Nayak.
10	4AL22AG010	NIHAR S ACHARYA	Nihar	Nihar.
11	4AL22AG011	NIKITHA		
12	4AL22AG012	NITHIN M SHETTY		
13	4AL22AG013	PRAJNA SHREE JAIN	Prajna	Prajna
14	4AL22AG014	PRANJAL P POOJARY	Pranjal	Pranjal
15	4AL22AG015	PRAPTHI N S		NCC
16	4AL22AG016	PUNEETH		
17	4AL22AG017	RAJITH S SHETTY		
18	4AL22AG018	REHAN MALLIK SHARIFFSAB	← LEFT →	
19	4AL22AG019	SAMANSH Y SUVARNA		
20	4AL22AG020	SUMA MG		
21	4AL22AG021	THEJAS A V		
22	4AL22AG022	THRUPTHI S RAI		
23	4AL22AG023	VEERESH METI		
24	4AL22AG024	VISHWANATH D CHAVADANNAVAR		
25	4AL22CV001	DHANUSH R		CIVIL
26	4AL22CV002	FAYAZ		"
27	4AL22CV003	HARSHITH KUMAR L		"
28	4AL22CV004	PAVAN GOWDA M D		"
29	4AL22CV005	PRUTHVI		"

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Sl.No.	BRANCH	NAME		
30	4AL22CV006	PUNEETHA B P	Puneetha.BP	CIVIL
31	4AL22CV007	SHREYANK S		"
32	4AL22ME001	ADHITYA MU		
33	4AL22ME002	ANANTHESH D KAMATH		
34	4AL22ME003	ANWESH R SHETTY		
35	4AL22ME004	ELVIN CHRIS DSOUZA		
36	4AL22ME005	KEERTHAN GOWDA K		
37	4AL22ME006	KRUPAKARA H		
38	4AL22ME007	MOHAMMAD SHAREEK		
39	4AL22ME008	PRADEEP		
40	4AL22ME009	SAMARTH	AB	AB
41	4AL22ME010	SHREEGOVINDA R		
42	4AL22ME011	SHYAM		
43	4AL22ME012	VEERESH		
44	4AL22ME013	VINAY KUMAR S		NCC
45	4AL22ME014	VISHWAS KONDA		

WORKSHOP COORDINATOR

PRINCIPAL
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Mijar, MOODBIDRI - 574 225, D.K

Title: Workshop Report: CNC Machine Problem Identification and Rectification

Date: July 17, 2023

Duration: 9:00 AM to 4:00 PM

Organized by: CNC Add on Lab, Dept of Mechanical Engineering

Participants:

Students of the Mechanical Engineering Department

Resource Person:

Mr. Dilip Godbole, Service Engineer, Hytech Automation, Pune

Session Overview:

The CNC Machine Problem Identification and Rectification Workshop was conducted on July 17, 2023, by the CNC Add on Lab, Department of Mechanical Engineering. The workshop aimed to provide students with practical knowledge and hands-on experience in diagnosing and resolving common issues encountered in CNC machines. Mr. Dilip Godbole, a service engineer from Hytech Automation, Pune, served as the resource person for the workshop.

Workshop Objectives:

Gain a comprehensive understanding of CNC machines and their components.

Learn about common problems encountered in CNC machines and their potential causes.

Develop skills in problem identification and analysis for CNC machines.

Acquire knowledge of troubleshooting techniques and strategies.

Understand preventive maintenance practices to minimize future issues.

Enhance practical skills through hands-on exercises and case studies.

One day Workshop on

CNC Machine Problem Identification and Rectification

The CNC Machine Problem Identification and Rectification Workshop was conducted on July 17, 2023, by the CNC Add on Lab, Department of Mechanical Engineering. The workshop aimed to provide students with practical knowledge and hands-on experience in diagnosing and resolving common issues encountered in CNC machines. Mr. Dilip Godbole, a service engineer from Hytech Automation, Pune, served as the resource person for the workshop.

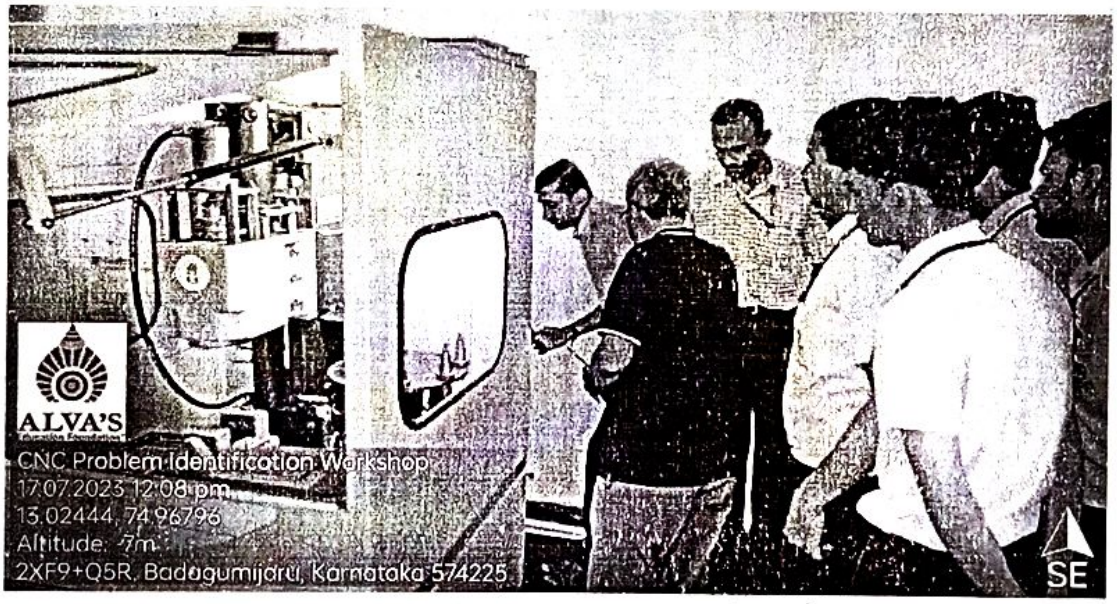
Mr. Dilip Godbole started the session by identifying an existing problem

The workshop began at 9:00 AM with a warm welcome to Mr. Dilip Godbole by Dr. Satyanarayan, the Head of the Mechanical Engineering Department. Prof. Pramod Kumar N, in charge of the CNC Add on Lab, then provided an overview of the workshop's objectives, emphasizing the importance of problem identification in CNC machines.

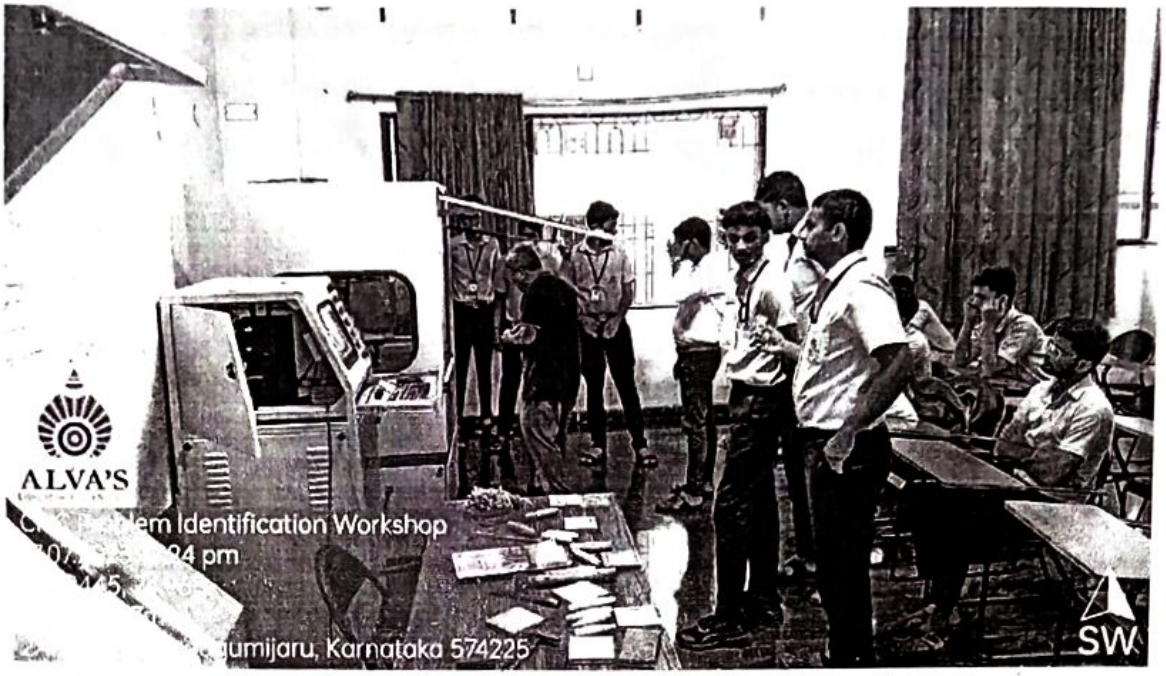
Mr. Dilip Godbole started the session by identifying an existing problem

Prof. Pramod Kumar N, in charge of the CNC Add on Lab, then provided an overview of the workshop's objectives

Mr. Dilip Godbole started the session by identifying an existing problem on a CNC milling center. He explained the step-by-step procedure to diagnose and solve the issue, demonstrating problem-solving techniques to the participants. The first problem addressed was the adjustment of hydraulic fluid pump pressure on the CNC mill. Mr. Dilip Godbole guided the participants through the process, highlighting the importance of proper hydraulic system maintenance.



Mr. Dilip Godbole started the session by identifying an existing problem on a CNC milling centre.



Mr. Dilip Godbole guided the participants through the process, highlighting the importance of proper hydraulic system maintenance.

The session continued with the identification of a mechanical problem related to the spindle rotation on the CNC mill. Mr. Dilip Godbole demonstrated how to troubleshoot and rectify the issue, providing insights into mechanical repairs and adjustments. He also discussed common PLC-related errors and shared strategies to resolve them effectively.

Prof. Pramod Kumar N, in charge of the CNC Add on Lab, then provided an overview of existing problem in CNC Turning centre

To enhance the participants' practical skills, hands-on training on repairing hydraulics was conducted. Students had the opportunity to apply their knowledge and work on hydraulic systems, under the guidance of Mr. Dilip Godbole.




In the latter part of the workshop, Mr. Dilip Godbole shifted the focus to CNC lathes. He explained the common problems encountered in CNC lathes, particularly software-related issues. Through practical demonstrations, he showcased how to diagnose and resolve these problems, emphasizing the significance of software maintenance and updates.

List of Participants

SL.NO	USN No.	Name of the Student
SL.NO	USN No.	Name of the Student
1	4AL21ME001	Ajith R
2	4AL21ME002	Akhil Sharma K
3	4AL21ME003	Akshay Krishna M
4	4AL21ME004	Charan Kumar
5	4AL21ME005	Dharshith A
6	4AL21ME006	Melvin Vinay sera
7	4AL21ME007	Mohammad Swalih
8	4AL21ME008	Narayan V
9	4AL21ME009	Navaneeth H Shetty
10.	4AL21ME010	Nithin M
11	4AL21ME011	Paigambar S Nadaf
12	4AL21ME013	Shashwath R Gowda

13	4AL21ME015	Sudesh D Shetty
14	4AL22ME401	KARTHIK VISWANATH DHANNUR
15	4AL22ME402	PRAVEEN VEERAPPA CHAVADI
16	4AL22ME403	KRISHNA KYADGIHALLI
17	4AL22ME400	KARTHIK GOWDA B C

Conclusion:

The CNC Machine Problem Identification and Rectification Workshop provided valuable insights and hands-on experience to the students of the Mechanical Engineering Department. Mr. Dilip Godbole, as the resource person, shared his expertise and guided the participants in problem identification and rectification processes. The session not only addressed issues in CNC milling centres but also provided a comprehensive understanding of CNC lathe problems.

The workshop not only equipped the students with practical knowledge but also emphasized the importance of regular maintenance and troubleshooting techniques for CNC machines. The hands-on exercises and interactive sessions enabled the participants to develop skills that will be beneficial in their future careers.

The CNC Add on Lab, along with the Mechanical Engineering Department, expressed their gratitude to Mr. Dilip Godbole for his valuable contributions and thanked all the participants for their active participation in making the workshop a success.

Workshop Coordinators

Pramod Kumar N **Hemanth Suvarna**

Dr Satyanarayan
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