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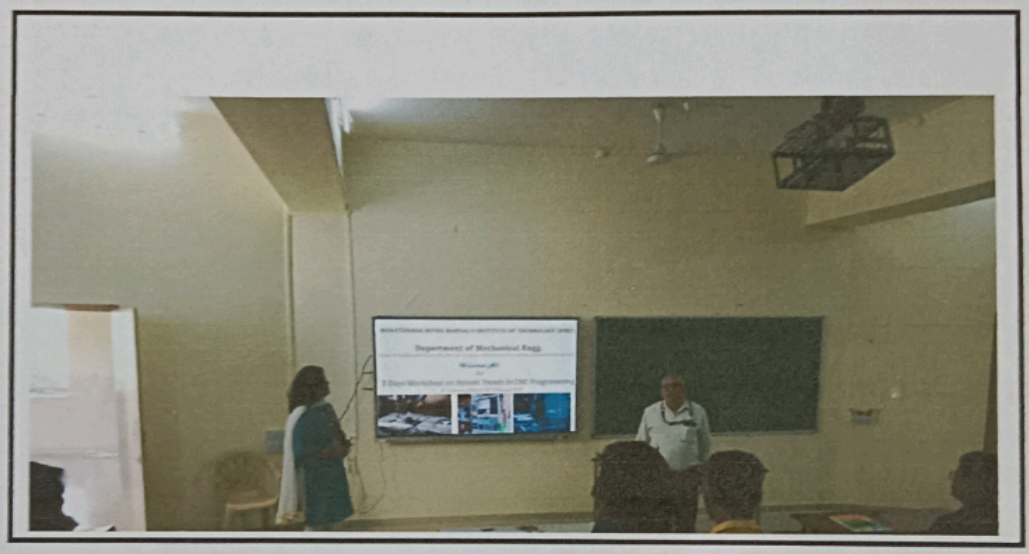
Techno -Social Excellence"
MARATHWADA MITRA MANDAL'S
INSTITUTE OF TECHNOLOGY (MMIT)
S.No.35, Plot No. 5/6, Lohgaon, Pune-411 047

INSTITUTION'S INNOVATION COUNCIL
(Ministry of HRD Initiativ

A REPORT ON

"Recent Trend In CNC Programming"

8 February 2024 To 10 February 2024



Organized By

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Name of Department

Department of Mechanical Engineering

Approved by **AICTE** New Delhi, Recognized by **DTE** Maharashtra & Affiliated to Savitribai Phule Pune

NAAC "A" Accredited Institute

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Head of Department, Mechanical Engineering, MMIT, Lohgaon, Pune

Coordinator

Name of Coordinator

Mr. Rajesh Dharmale

Workshop superintendent , Mechanical Engineering, MMIT, Lohgaon, Pune

Notice: Title of Workshop/Seminar/Conference

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Ref. No. MMIT/Admin/2022-23 Date: 05/02/2024

All the student of SE and TE Mechanical Engineering informed that Mechanical Engineering Department organize Three Days "Workshop on Recent Trend in CNC Programing" .The workshop will schedule between 08/02/24 to 10/02/24 .The interested student enroll your name in workshop Department before 07/02/24.

Workshop Superintendent

HoD Mechanical

About Program:

Recent trends in CNC programming aim to achieve several objectives, reflecting advancements in technology, industry demands, and manufacturing efficiency. Here are some common objectives:

1. **Automation and Efficiency**: CNC programming trends focus on enhancing automation levels to reduce manual intervention, minimize errors, and improve overall efficiency in manufacturing processes.
2. **Optimization for Complex Geometries**: With the rise of additive manufacturing and demand for intricate designs, CNC programming trends emphasize the ability to handle complex geometries effectively. This includes developing algorithms and software tools that can efficiently program CNC machines to produce complex shapes and surfaces.
3. **Integration with CAD/CAM Systems**: There's a growing emphasis on seamless integration between CAD (Computer-Aided Design) and CAM (Computer-Aided Manufacturing) systems. This integration streamlines the programming process by allowing engineers to directly translate designs into machine instructions, reducing manual programming efforts and potential errors.
4. **Multi-Axis Machining**: Recent trends in CNC programming focus on multi-axis machining capabilities to enable the production of more complex parts with greater precision. This includes developments in 5-axis and even 9-axis machining, allowing for more flexibility and efficiency in manufacturing processes.
5. **Adaptive Machining and Real-Time Adjustments**: CNC programming trends increasingly involve adaptive machining techniques that enable real-time adjustments based on factors like tool wear, material variations, or environmental conditions. This helps optimize machining processes, improve quality control, and reduce waste.
6. **Simulation and Verification**: There's a growing emphasis on simulation and verification tools in CNC programming to ensure the accuracy of machining processes before actual production. Advanced simulation software allows

7. programmers to visualize toolpaths, detect potential collisions, and optimize machining strategies before running jobs on the shop floor.
8. **Digital Twin and Virtual Commissioning**: The concept of digital twins, virtual representations of physical manufacturing systems, is becoming more prominent in CNC programming trends. Virtual commissioning allows manufacturers to simulate and validate CNC programs in a virtual environment before deploying them on actual machines, reducing downtime and improving overall productivity.
9. **Connectivity and Industry 4.0 Integration**: CNC programming trends align with the principles of Industry 4.0 by emphasizing connectivity, data exchange, and smart manufacturing. This includes integrating CNC machines with IoT (Internet of Things) devices, cloud-based platforms, and data analytics tools to enable real-time monitoring, predictive maintenance, and optimization of manufacturing processes.

By addressing these objectives, recent trends in CNC programming contribute to advancing manufacturing capabilities, improving product quality, and enhancing overall productivity in various industries.

Activities performed:

Activities are performed to translate a design into machine instructions for manufacturing.

Typically involved in CNC programming:-

1. **Tool Selection**: Selecting appropriate cutting tools based on factors such as material type, part geometry, and desired surface finish is crucial. CNC programmers choose the right tools for each machining operation.
2. **Toolpath Generation**: This involves creating a series of toolpaths that define the movements of the cutting tool to remove material and shape the part according to the design requirements. Toolpath generation considers factors like cutting strategy, machining sequence, and optimization for efficiency.
3. **Speeds and Feeds Calculation**: Determining the optimal cutting speeds (RPM) and feed rates (inches per minute or millimeters per minute) for each tool and material combination is essential for achieving efficient machining while maintaining part quality.

4. **Machining Strategy Selection**: CNC programmers decide on the appropriate machining strategies based on factors such as part geometry, material properties, and desired surface finish. Common strategies include roughing, finishing, contouring, drilling, and pocketing.
5. **Post-Processing**: Once toolpaths are generated, they need to be converted into machine-specific CNC code (G-code or M-code) using post-processing software. This step ensures compatibility between the generated program and the CNC machine controller.
6. **Simulation and Verification**: Before executing the CNC program on the actual machine, programmers often simulate the machining process using specialized software. This step helps detect errors, verify toolpaths, check for collisions, and optimize machining parameters.
7. **Optimization**: Continuous optimization of toolpaths, cutting parameters, and machining strategies is important to improve efficiency, reduce cycle times, minimize tool wear, and enhance surface finish.
8. **Documentation**: Proper documentation of CNC programs, tooling setups, cutting parameters, and machining instructions is essential for repeatability, troubleshooting, and quality control.
9. **Setup Instructions**: CNC programmers may also provide setup instructions and guidelines for machine operators, including fixture setup, tool loading, workpiece alignment, and machine startup procedures.

By performing these activities effectively, CNC programmers can create accurate, efficient, and reliable machining programs to produce high-quality parts with CNC machines.

Outcome:

The outcome of CNC programming is the successful execution of machining operations on a CNC (Computer Numerical Control) machine to produce parts according to specified design requirements.

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MECHANICAL ENGINEERING DEPARTMENT

S.E. MECHANICAL ENGG.

3 Days Workshop on Recent Trend in CNC Programming

Attendance

Roll No.	Name of Student	8/2/2024	9/2/2024	10/2/2024
SMA01	ANECHA UTKARSH SANDEEP			
SMA02	AROTE RUSHIKESH JITENDRA			
SMA03	BAGALI SHIVANAND PRAKASH			
SMA04	BHADANE NISHANT BAPU			
SMA05	BHOYATE SUMIT NARAYAN			
SMA06	DALVI ABHIJEET RAJARAM			
SMA07	DESHMUKH VAIBHAV RAJKUMAR			
SMA08	GADEKAR PRATHAMESH LAXMAN			
SMA09	GHOLAP MANTHAN SANDEEPKUMAR			
SMA10	KOSHTI RUTUJA DATTATRAY			
SMA11	KULKARNI ADITYA SANTOSH			
SMA12	KUMBHAR OMKAR SHASHIKANT			
SMA13	LOKHANDE PARESH RAVINDRA			
SMA14	MAHADIWALE SHIVAM NILKANTH			
SMA15	MAVKAR PURVA JAYSING			
SMA16	MHASKE PRASHANT SHAHURAJ			
SMA17	MISHRA ABHAY SHRIBHAVKUMAR			
SMA18	MUTHE PRAMOD NAMDEV			
SMA19	POKHARKAR SIDDHESH UTTAM			
SMA20	RATHOD RAMVILAS CHAMPAT			
SMA21	RAUT SOHAM SANTOSH			
SMA22	RUSHIKESH GOKUL KADAM			
SMA23	SALUNKE SWAPNIL HARIBHAU			
SMA24	SHINDE ADITYA SAHADEV			
SMA25	SIDLEYASH SHARAD JADHAV			
SMA26	THOKE TUSHAR BHAGWAN			
SMA27	UBALE ATHARVA RAHUL			
SMA28	ZAGADE ROHIT LAXMAN			
SMA29	ATHARVA SANTOSH DIXIT			
SMA30	HARSHAL SANJAY UGALE			
SMA31	OM ANIL CHAVAN			
SMA32	SURAJ JAMIR TAMBOLI			
SMA33	PRASAD RAMA BANDI			
SMA34	OM UMESH DHAWANE			

Glimpses of the Session:

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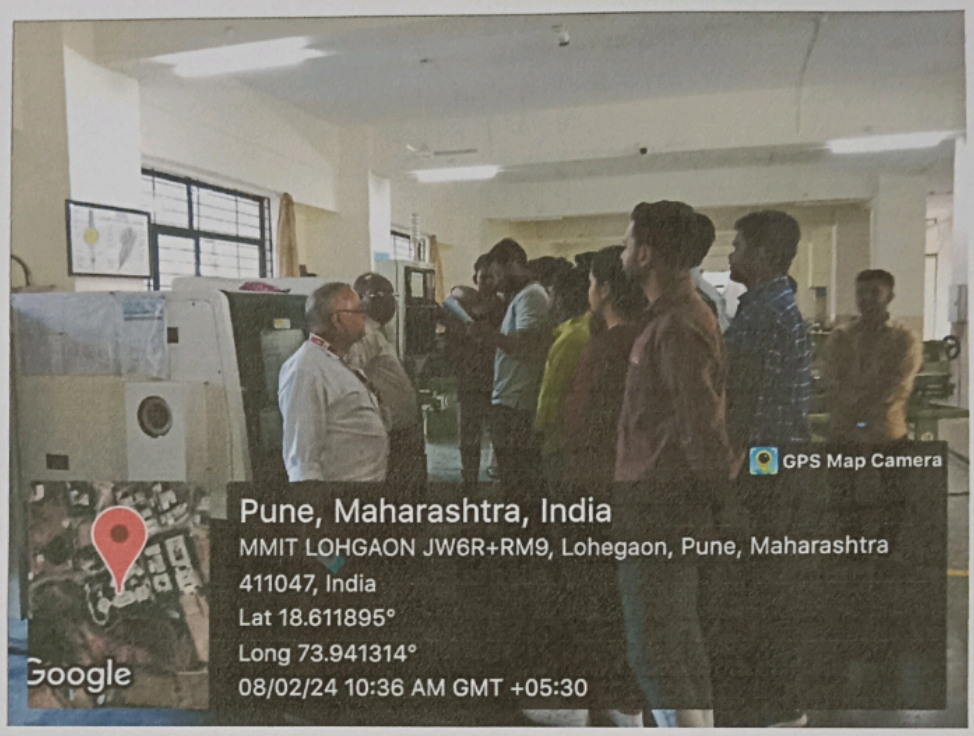

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Coordinator

Head of Department

Department of Mechanical Engineering * MMIT