



COIMBATORE INSTITUTE OF TECHNOLOGY

(Government Aided Autonomous Institution Affiliated to Anna University and Accredited by NBA)
Civil Aerodrome post, Peelamedu, Coimbatore - 641014

DEPARTMENT OF MECHANICAL ENGINEERING

23ME413 MANUFACTURING PROCESSES II

MICRO PROJECT TOPICS:

- 1. Design and Fabrication of a Simple CNC Plotter:**
 - o Build a basic CNC plotter using readily available materials and components.
 - o Focus on understanding CNC programming and machine operation.
- 2. Optimization of Drilling Parameters for Different Materials:**
 - o Study the effect of varying drill speeds and feed rates on different materials.
 - o Analyze the impact on surface finish and tool wear.
- 3. Development of a Tool Wear Monitoring System:**
 - o Create a system using sensors to monitor tool wear during machining.
 - o Implement basic data acquisition and analysis.
- 4. Comparison of Surface Finish Using Different Cutting Fluids:**
 - o Test various cutting fluids on a specific machining process.
 - o Measure and compare the surface finish quality of machined parts.
- 5. Fabrication and Testing of a Simple Gear Mechanism:**
 - o Design and fabricate a simple gear mechanism using manual or CNC machines.
 - o Test its efficiency and analyze the gear ratios.
- 6. Development of a Low-Cost Vibration Damping System for Machine Tools:**
 - o Design a vibration damping system to reduce chatter during machining.
 - o Test its effectiveness on a machine tool.
- 7. Micro-Milling of Complex Shapes:**
 - o Use a micro-milling machine to create complex shapes.
 - o Study the challenges in tool wear, accuracy, and surface finish.
- 8. Study and Implementation of Automated Tool Changing Mechanism:**
 - o Design a basic automated tool changer for a milling or lathe machine.
 - o Demonstrate the mechanism through a working prototype.
- 9. Analysis of Heat Generation and Dissipation in High-Speed Machining:**
 - o Measure and analyze heat generation in high-speed machining processes.
 - o Explore methods to improve heat dissipation.
- 10. Design and Fabrication of a Small-Scale Pneumatic Clamping System:**
 - o Develop a pneumatic clamping system for holding workpieces.
 - o Test its efficiency and reliability during machining operations.



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Micro Project Instructions and Objectives

Project Title:

Choose any one topic from the provided list or propose a relevant topic approved by the instructor.

Objective:

- To apply theoretical knowledge of machining technology and machine tools to practical, real-world problems.
- To develop hands-on experience in designing, fabricating, and testing small-scale engineering solutions.
- To enhance skills in teamwork, project management, documentation, and presentation.

Instructions:

1. **Project Selection:**

- Choose a topic from the provided list or suggest a custom topic related to machining technology and machine tools.
- Submit the project proposal for approval by [date].

2. **Team Formation:**

- Form teams of 3-4 students.
- Assign roles and responsibilities within the team (e.g., project manager, researcher, fabricator, and presenter).

3. **Project Planning:**

- Develop a project plan, including a timeline, resource requirements, and expected outcomes.
- Identify the tools, machines, and materials needed.

4. **Execution:**

- Conduct research and design the project.
- Carry out the fabrication and testing of the project component or system.
- Document all processes, including design iterations, challenges faced, and solutions implemented.

5. **Report Writing:**

- Prepare a detailed project report covering the following sections:
 - **Introduction:** Project background and relevance.
 - **Objective:** Specific goals and expected outcomes.
 - **Methodology:** Step-by-step approach, tools, and techniques used.
 - **Results:** Findings, observations, and performance analysis.
 - **Conclusion:** Summary of results, lessons learned, and potential improvements.
 - **References:** Any sources used in research.

6. **Presentation:**

- Create a presentation summarizing the project.
- Include visuals such as diagrams, photos of the prototype, and graphs of results.



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- o Each team will have 10 minutes to present, followed by a 5-minute Q&A session.
- 7. Evaluation:**
- o Projects will be evaluated based on:
 - **Innovation and Creativity: 20%**
 - **Technical Accuracy and Depth: 20%**
 - **Practical Implementation: 20%**
 - **Report Quality: 20%**
 - **Presentation Skills: 20%**
- 8. Submission Deadlines:**
- **Project Proposal: 27.02.2025**
 - **Project Report: 2nd Week of April 2025**
 - **Presentation: 1st week of March 2025**

Deliverables:

1. Project Proposal
2. Completed Project Report
3. Working Prototype/Model (if applicable)
4. Presentation Slides