



### REPORT

#### Details of Activity:

<b>Name of the Activity</b>	"Design and Validation of Mechanical Components using CAE Tool"		
<b>Date &amp; Time</b>	15 Hours	<b>Department / Committee</b>	Mechanical
<b>Venue</b>	CAD CAM Lab	<b>No. of Participants</b>	32
<b>Nature of Activity</b>	Workshop	<b>Mode of Activity</b>	Offline
<b>Name of Activity In-charge</b>	Mr. Sangam Rane	<b>Name of Activity Coordinator</b>	Mr. Sangam Rane
<b>Name and Affiliation of Resource person</b>	Mr. Sangam Rane		

#### Activity Information:

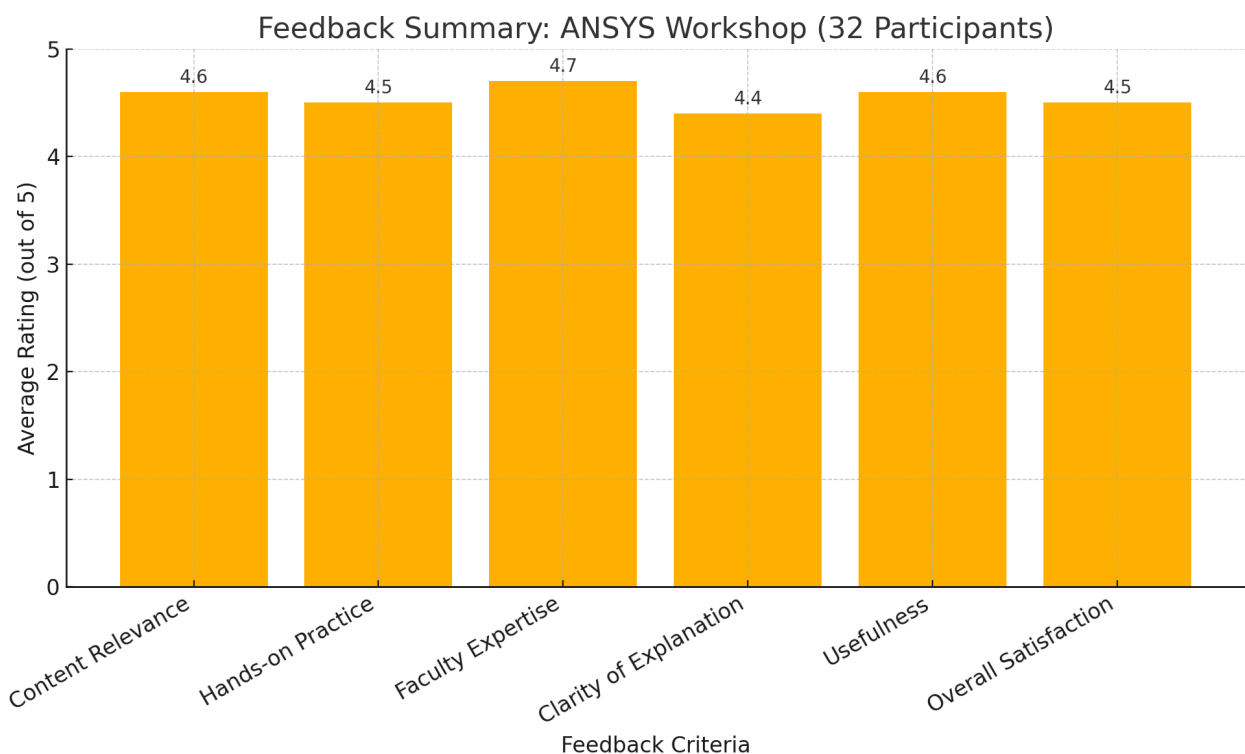
<b>Objectives</b>	<p>The key objectives achieved through this workshop were:</p> <ul style="list-style-type: none"> <li>To familiarize students with the fundamentals of CAE and its importance in modern design processes.</li> <li>To provide <b>hands-on training</b> in using ANSYS software for mechanical design and validation.</li> <li>To develop an understanding of <b>stress, thermal, and vibration analyses</b> of mechanical components.</li> <li>To enhance <b>problem-solving and analytical thinking</b> through simulation-based learning.</li> <li>To expose students to <b>industrial case studies</b> for practical insight into real-world applications.</li> </ul>
<b>Target Audience</b>	TE Mechanical Engineering students
<b>Methodology</b>	<p>The workshop combined theoretical instruction with practical demonstrations. Each session began with an introduction to fundamental design or simulation concepts, followed by live demonstrations on ANSYS. Students were given tasks to perform independently, fostering self-learning and exploration.</p> <p>On the final day, participants conducted mini-projects, where they modeled and validated a simple mechanical component (like a bracket or shaft) under given loading conditions.</p>
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>Students learned to perform <b>stress and thermal analyses</b> on mechanical parts.</li> </ul>

	<ul style="list-style-type: none"> <li>• They understood the importance of <b>design validation</b> before manufacturing.</li> <li>• Enhanced confidence in <b>using CAE tools independently</b>.</li> </ul>
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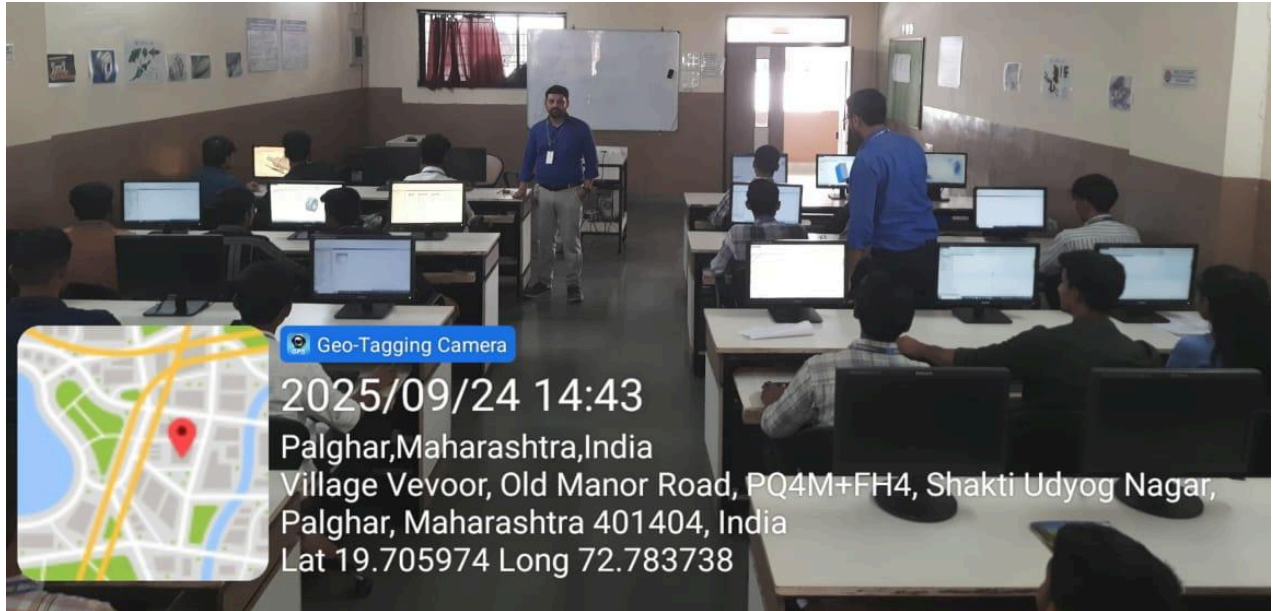
### SWOT Analysis of the Event:

Strength	Weakness	Opportunity	Threats
<ul style="list-style-type: none"> <li>• Practical, Industry-Relevant Content:</li> <li>• Hands-on Training:</li> <li>• Experienced Faculty</li> <li>• Coordination:</li> <li>• Low-Cost:</li> <li>• High Student Engagement:</li> <li>• Institutional Support:</li> </ul>	<ul style="list-style-type: none"> <li>• Limited Duration</li> <li>• Software Accessibility</li> <li>• Outside Campus</li> <li>• Restricted to Mechanical Students</li> <li>• Lack of Assessment or Certification Criteria</li> <li>• Limited Industry Interaction</li> </ul>	<ul style="list-style-type: none"> <li>• Expansion into Advanced CAE Topics</li> <li>• Collaboration with Industry/SAE Chapters</li> <li>• Project-Based Learning Integration</li> <li>• Certification and Skill Endorsement</li> <li>• Online and Hybrid Learning Options</li> </ul>	<ul style="list-style-type: none"> <li>• Software Licensing and Compatibility Issues</li> <li>• Competition from Online Platforms</li> <li>• Limited Continuity Post-Workshop</li> <li>• Hardware Limitations</li> <li>• Student Attendance and Academic Pressure</li> </ul>

### Feedback Analysis: *Feedback in graphical form*



**Geo-Tagged Photo :**



**Proofs & Documents Attached (Tick mark the proofs attached) :**

<input type="checkbox"/>	Notice / Brochure	<input type="checkbox"/>	Feedback Form
<input type="checkbox"/>	Attendance list	<input type="checkbox"/>	Feedback Analysis
<input type="checkbox"/>	Photos	<input type="checkbox"/>	Media News Details
<input type="checkbox"/>	Certificate	<input type="checkbox"/>	Any Other

Prepared By	Checked By
Name & Dated Signature of Coordinator	Name & Dated Signature of Committee In- charge

**Date of Activity: Every Wednesday (Activity hours)**

**Date of Report Submission: 07<sup>th</sup> November 2025.**

**Reason for delay if any:**

**Approved By  
HOD Signature**

**Date: 07<sup>th</sup> November 2025.**



## Report on the Conduction of Three-Day Workshop on “Design and Validation of Mechanical Components using CAE Tool” Under SAE

### Organized by:

Department of Mechanical Engineering,  
St. John College of Engineering and Management, Palghar

### Under the Banner of:

SAE (Society of Automotive Engineers)

**Workshop Dates:** Wednesday (Activity Hours)

**Venue:** CAD/CAM Laboratory, Mechanical Engineering Department

**Coordinator:** Mr. Sangam Rane (Assistant Professor, Mechanical Department)

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### 1. Introduction

The Department of Mechanical Engineering organized a three-day workshop titled “*Design and Validation of Mechanical Components using CAE Tool*” under SAE. The workshop was designed to enhance students’ understanding of Computer-Aided Engineering (CAE) and its application in the design and analysis of mechanical components.

The sessions aimed to bridge the gap between theoretical design concepts and practical implementation using simulation tools such as ANSYS. Participants received comprehensive exposure to design validation, stress analysis, and optimization methods widely used in industry.

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### 2. Objectives

The key objectives achieved through this workshop were:

- To familiarize students with the fundamentals of CAE and its importance in modern design processes.
- To provide **hands-on training** in using ANSYS software for mechanical design and validation.
- To develop an understanding of **stress, thermal, and vibration analyses** of mechanical components.
- To enhance **problem-solving and analytical thinking** through simulation-based learning.



- To expose students to **industrial case studies** for practical insight into real-world applications.

### 3. Participants

The workshop was attended by **48 undergraduate students** from the Department of Mechanical Engineering, primarily from the third and final year. The participants showed keen interest in the sessions and actively participated in both theoretical and practical exercises.

### 4. Duration and Schedule

The workshop spanned over three days (total 15 hours) and covered the following topics:

Sr. No.	Topic	Duration (Hours)	Mode
1	Basics of Machine Design and Stress Analysis	3	Lecture
2	Design Fundamentals and Stress Analysis Techniques	3	Lecture + Demo
3	Introduction to CAE Tools (ANSYS Interface)	3	Hands-on
4	Thermal and Vibration Analysis using ANSYS	3	Hands-on
5	Design Validation, Optimization, and Case Studies	3	Practical + Discussion

### 5. Resource Utilization

**Software:** ANSYS 2024 (Student Version)

**Hardware:** High-performance PCs (1 system per 2 participants)

**Venue:** CAD/CAM Laboratory equipped with projector and whiteboard facilities



All resources were adequately utilized, and the software performed efficiently throughout the sessions.

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## 6. Methodology

The workshop combined **theoretical instruction** with **practical demonstrations**. Each session began with an introduction to fundamental design or simulation concepts, followed by live demonstrations on ANSYS. Students were given tasks to perform independently, fostering self-learning and exploration.

On the final day, participants conducted **mini-projects**, where they modeled and validated a simple mechanical component (like a bracket or shaft) under given loading conditions.

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## 7. Feedback and Outcomes

A feedback form was collected from all participants at the end of the workshop.

### Key highlights of the feedback:

- 92% of students rated the workshop as “*Excellent*” or “*Very Good*”.
- Students appreciated the **hands-on exposure** and **clarity of teaching**.
- Many expressed interest in **pursuing CAE-based projects** in their final year.

### Learning Outcomes:

- Students learned to perform **stress and thermal analyses** on mechanical parts.
  - They understood the importance of **design validation** before manufacturing.
  - Enhanced confidence in **using CAE tools independently**.
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## 8. Registration and Certification

A nominal registration fee of ₹50 per student was collected.

All participants were awarded **Certificates of Participation** at the end of the workshop by the Head of the Department and Workshop Coordinator.



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## 9. Conclusion

The three-day workshop on “Design and Validation of Mechanical Components using CAE Tool” was successfully conducted and met its intended objectives. It provided an enriching platform for students to explore simulation-based design, bridging academic learning with industrial relevance.

The department plans to organize **advanced-level sessions** in the future focusing on **Finite Element Analysis (FEA) projects and design optimization** to further strengthen students’ technical competencies.

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## 10. Coordinators and Organizing Team

- **Faculty Coordinator:** Mr. Sangam Rane
  
- **Student Coordinators:**
  - Mr. Paras Patil (Third Year MECH)
  
  - Ms. Rachana Verma (Third Year MECH)