# Report on One-Day Faculty Development Program (FDP)
# on
# "Mastering Pneumatic & Electro-Pneumatic Systems"

**Organized by:**

Mechatronics Department
G H Patel College of Engineering & Technology (GCET)
In collaboration with Janatics India Pvt. Ltd., Coimbatore

**Date & Venue:**

🗓️ 10th March 2025, Monday
🕘 09:30 AM onwards
📍 Mechatronics System Lab, GCET

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## 1. Introduction:

The **Mechatronics Department of GCET**, in collaboration with **Janatics India Pvt. Ltd., Coimbatore**, successfully organized a **one-day Faculty Development Program (FDP)** on **"Mastering Pneumatic & Electro-Pneumatic Systems"** on **10th March 2025**. The FDP aimed to enhance faculty members' knowledge and practical understanding of **pneumatic and electro-pneumatic systems** used in automation industries.

The program provided a blend of **theoretical concepts, practical demonstrations, and hands-on training** using industrial components and simulation tools.

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## 2. Objectives of the FDP:

- To provide **fundamental knowledge** of pneumatic and electro-pneumatic systems.
- To explore the **basic components, actuators, and control valves** used in pneumatic automation.
- To introduce **electro-pneumatic circuits and their industrial applications**.
- To familiarize participants with **PLC-based pneumatic control systems**.
- To discuss **troubleshooting and maintenance** of pneumatic systems.
- To conduct a **hands-on session** on pneumatic simulation software.

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## 3. Inauguration & Opening Remarks:

The FDP began with a warm welcome address by **Prof. Sanjiv Rajput, Assistant Professor, Mechatronics Department**, who also served as the **coordinator** of the program. He highlighted the importance of **pneumatic automation in modern industries** and the need for faculty members to stay updated with the latest technologies.

As a token of appreciation, **bouquets were presented to the industry personnel, Ms. Hiral, Mr. Chintan and Mr. Shekhawat, by Dr. Vinod Patel, Head of the Mechatronics Department.**

The session was further enriched by the presence of **experts from Janatics India Pvt. Ltd.**, who shared insights into **pneumatic automation trends, industry requirements, and real-world applications**.

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## 4. Technical Sessions & Hands-on Training:

The **Faculty Development Program (FDP)** was structured into a series of comprehensive technical sessions, each designed to provide faculty members with in-depth knowledge and practical exposure to **pneumatic and electro-pneumatic systems**. These sessions covered both **theoretical fundamentals** and **real-world industrial applications**, ensuring that participants gained a holistic understanding of pneumatic automation.

The sessions were **interactive and hands-on**, featuring **live demonstrations**, **circuit simulations**, and **troubleshooting exercises**. Experts from **Janatics India Pvt. Ltd.** shared valuable insights into modern pneumatic technologies, helping participants understand their significance in automation and control systems.

### Session 1: Introduction to Pneumatics & Electro-Pneumatics

The **first session** focused on the **fundamentals of pneumatic and electro-pneumatic systems** used in industrial automation. The session covered:

- **Basics of Pneumatic Power Transmission:** Explanation of how compressed air is used as a power medium, its advantages, and applications in automation.
- **Comparison between Pneumatics, Hydraulics, and Electrical Automation:** Discussion on the differences between **pneumatic, hydraulic, and electrical control systems**, including their efficiency, cost-effectiveness, and suitability for various industrial applications.
- **Industrial Applications of Pneumatics:** Overview of how pneumatic technology is used in **manufacturing, robotics, automotive, and material handling systems**.

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### Session 2: Components of a Pneumatic System

This session provided a **detailed breakdown of the key components** used in a **pneumatic system** and their functionality. The session included:

- **Understanding Pneumatic Actuators & Control Valves:** Explanation of **single-acting and double-acting cylinders**, rotary actuators, and their roles in mechanical motion control.
- **Flow Control and Directional Control Valves:** Live **demonstration of different types of control valves**, including **2/2-way, 3/2-way, 4/2-way, and 5/2-way directional control valves**, and their applications in pneumatic circuits.
- **Pressure Regulators, Filters, and Lubricators (FRL Unit):** Discussion on the importance of compressed air treatment, maintaining system efficiency, and increasing the longevity of pneumatic components.

Participants actively engaged in identifying and assembling various **pneumatic components**, allowing them to develop a deeper understanding of **system design and troubleshooting**.

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## Session 3: Electro-Pneumatic Circuits & Applications

The third session introduced participants to **electro-pneumatic systems**, where electrical signals are used to **control pneumatic actuators**. This session included:

- **Design and Implementation of Electro-Pneumatic Control Circuits:** Explanation of how **solenoid-operated directional control valves** and **relays** are used in modern pneumatic automation.
- **Introduction to PLC-Based Pneumatic Control Systems:** Overview of **Programmable Logic Controllers (PLCs)** and their role in automating pneumatic operations.
- **Hands-on Circuit Building:** Participants worked on **circuit diagrams** and were guided in **assembling basic electro-pneumatic circuits** using push buttons, sensors, and actuators.

This session provided essential knowledge for faculty members to incorporate **advanced automation concepts** into their academic curriculum and research.

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## Session 4: Hands-on Session on Pneumatic Simulation Software

The final session was a **hands-on practical session**, allowing participants to work with **industry-standard pneumatic simulation software**. The objectives of this session were:

- **Introduction to Pneumatic Circuit Design Software:** Overview of popular simulation tools such as **FluidSIM, Automation Studio, and FESTO Didactic**.
- **Virtual Circuit Testing:** Participants **designed and tested various pneumatic circuits** in a simulated environment, helping them understand real-time operational behaviors.
- **Application-Based Simulations:** Simulations of **pick-and-place mechanisms, conveyor automation, and robotic arm movements** using pneumatic actuators.

This hands-on experience helped participants bridge the gap between **theory and practical implementation**, reinforcing the concepts learned throughout the FDP.

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## 5. Interactive Q&A & Valedictory Ceremony:

The FDP concluded with an **interactive Q&A session**, where participants discussed queries related to **design, implementation, and industrial applications** of pneumatic and electro-pneumatic systems.

During the **valedictory ceremony**, participants shared their feedback, expressing appreciation for the **well-structured sessions, practical exposure, and real-world insights** provided by the experts.

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## 6. Conclusion & Vote of Thanks:

The program successfully met its objectives by equipping faculty members with **practical knowledge and industry insights** into **pneumatic and electro-pneumatic systems**.

A formal **vote of thanks** was delivered by **Prof. Sanjiv Rajput**, expressing gratitude to **Janatics India Pvt. Ltd., the organizing team, faculty members, and participants** for their enthusiastic involvement.

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## 7. Outcome of the FDP:

- Enhanced faculty understanding of **pneumatic automation technologies**.
- Improved ability to **implement electro-pneumatic circuits in academic and industrial projects**.
- Hands-on exposure to **PLC-based pneumatic control systems and simulation tools**.

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## 8. Acknowledgment:

The **Mechatronics Department of GCET** extends sincere thanks to **Janatics India Pvt. Ltd., Coimbatore**, for their invaluable contribution and expertise. Special thanks to the **faculty coordinators, organizing team, and participants** for making this FDP a success.

We look forward to organizing more **industry-driven workshops and training sessions** in the future.

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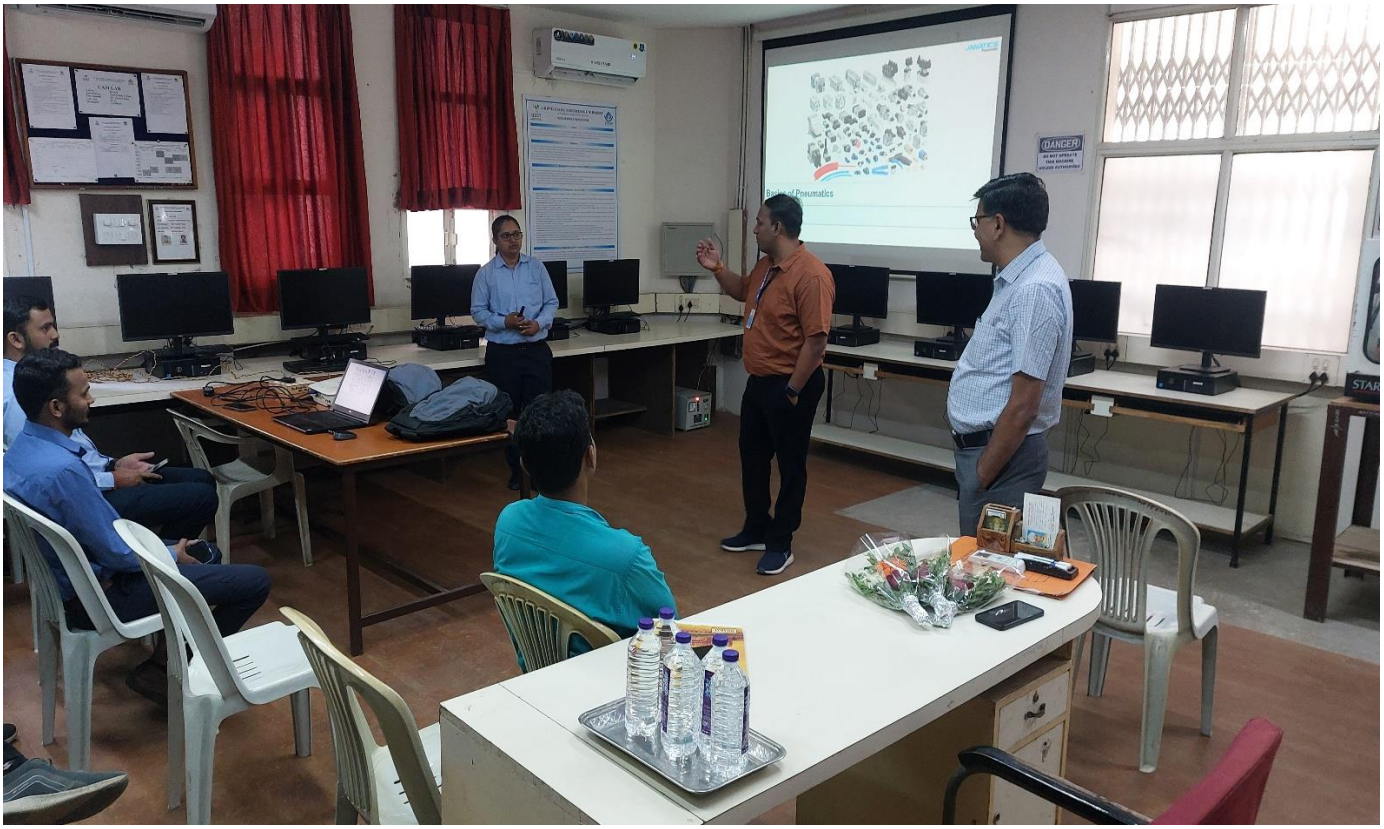
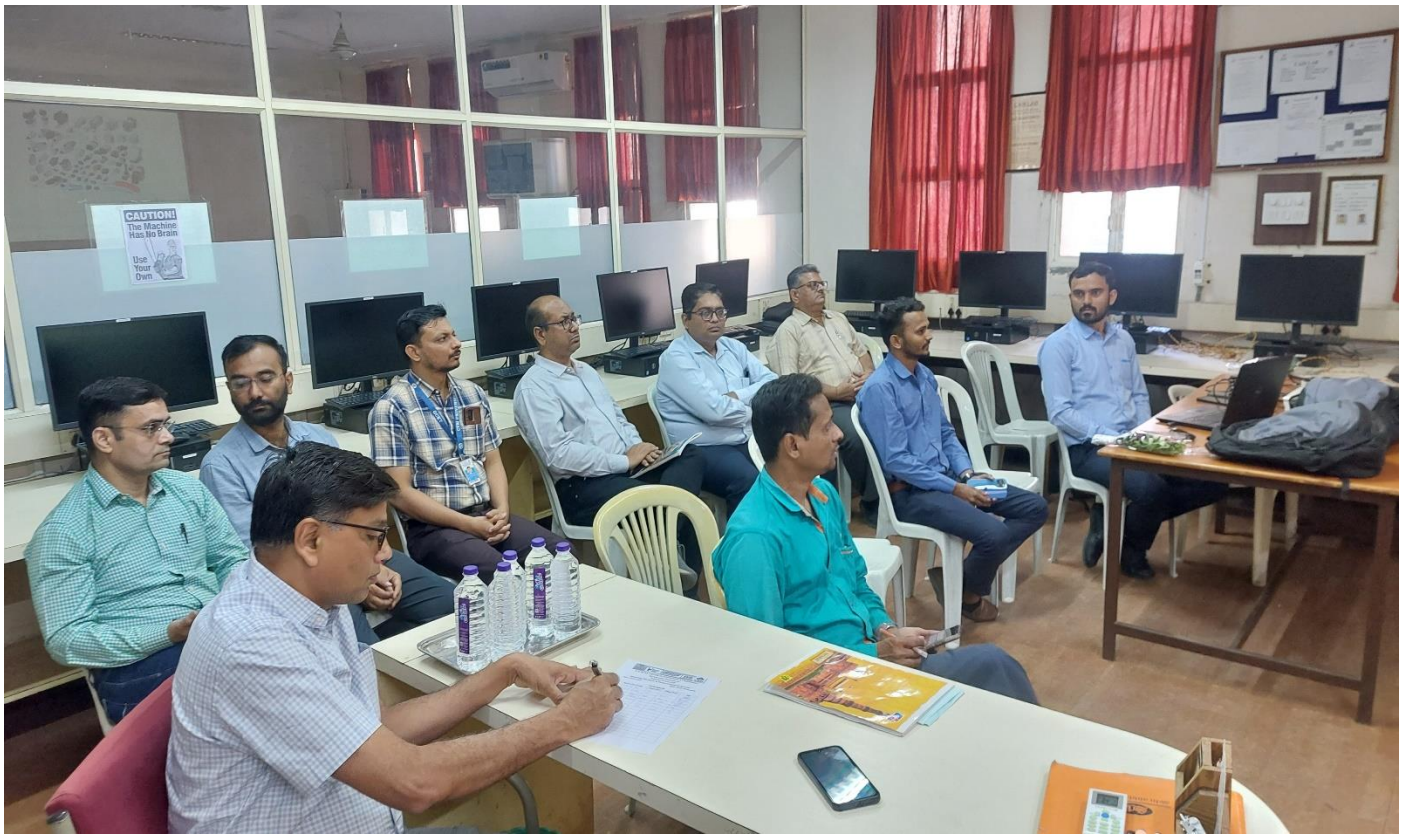
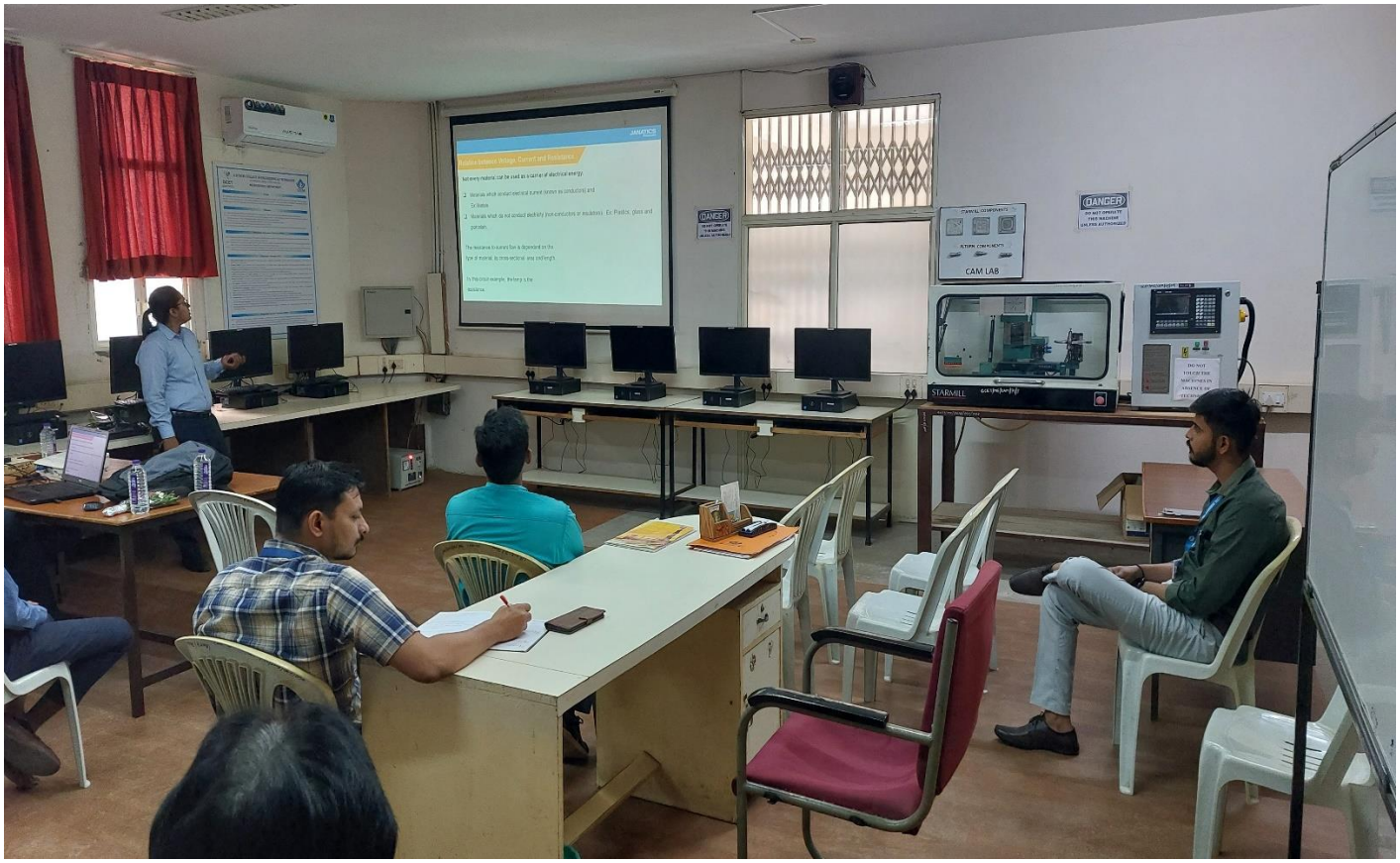
# Event Photos





Basics of Pneumatics


CAUTION!
The Machine
Has No Brain
Use
Your
Own


CAM LAB
DANGER
STARMILL

# G. H. PATEL COLLEGE OF ENGINEERING & TECHNOLOGY

## Mechatronics Department

## "Industry-Driven FDP

## Mastering Pneumatic & Electro-Pneumatic Systems "

**Date: 10/03/2025** **Time: 09:30 AM onwards**

## Participants

| Sr. No. | Name of the Faculty | Department | College Name | Sign |
|---|---|---|---|---|
| 1 | Umang B. Jani | MC | GCET | |
| 2. | Jvalant B. Trivedi. | ME | GCET | |
| 3 | Nikunj S. Yagnik | AE | ADIT | |
| 4 | SAURIN M SHETH | MC | GCET. | |
| 5 | Dr Ketan M Tambekar | MC | GCET | |
| 6 | Ajay M Patel | MC | GCET | |
| 7 | Faijubhai R. Malek | ME | GCET | |
| 8 | Dr. Vinod N Patel | ME | GCET | |
| 9 | Pathik P. Patel | MC | GCET | |
| 10 | Pinkesh A. Patel | MC | GCET | |
| 11 | Rakesh P Patel | MC | GCET | |
| 12. | Harsh G. Tailor | MC | BBIT | |
| 13 | Sankalp Bhatia | ME | ADIT | 10/3/25 |
| 14 | Hemant Rathod | MC | GCET | 10/3/25 |
| 15. | Sanjiv Rajput | MC | GCET | |
| 16 | Bhavik Hodeghomal | MC | GCET | |
| 17. | Digant Raval | MC | GCET | |

Prof. Sanjiv Rajput 10/03/2025
Event Coordinator

- **Prepared by:** **Prof. Sanjiv Rajput**
  **Assistant Professor**
  **Mechatronics Department**
  **G H Patel College of Engineering & Technology (GCET)**