REPORT of STTP on

"Basics of Mechatronics"

Date and Venue

With the support of Commissionrate of Technical Education (CTE), DesignTech and ISTE, Ahmedabad the Electronics and Communication Engineering department, L.D College of Engineering, Ahmedabad had organized a one week short term training programme on "Basics of Mechatronics" during 5th -9thDecember 2016 at Seimens Centre of Excellence, Block No. 5, Workshop, Mechanical Department, L.D. College of engineering, Ahmedabad.

Learning Objectives

The programme was intended for the engineers to understand the multidisciplinary skills required for industry . Its objective was

- To present basic study of fundamentals of Mechatronics (combination of Pneumatics, Mechanical, Electrical and Electronics).
- To give an idea of automation in manufacturing units.
- To demonstrate automated system and detailed study of all components involved including hardware and software.
- To make the participants conversed with PLC programming.

STTP Organizing Committee

- Patron- Dr. G.P Vadodaria (Principal, L.D College of Engineering)
- Convenor-Prof. Usha Neelakantan (HoD EC, L.D College of Engineering)
- Coordinators
 - Prof. K.G Vaghela (Associate Professor LDCE)
- Co-coordinators

 Prof. P.J Bhrambhatt (Associate Professor LDCE)

Expert Speakers

There were two experts from the Siemens COE (Centre of Excellence), LDCE, Ahmedabad. Mr. Shaheed Sharma, Sr. Automation Engineer, DesignTech Systems Ltd and Mr. Akash Joshi, Electrical Engineer, DesignTech Systems Ltd. were the course experts.

STTP Course contents

Day1

- Registration and Inauguration
- Introduction to Mechatronics
- System Approach, Energy, Mass and Information flow diagram

Day 2

- Usage of Electrical components in mechatronics
- Usage of Mechanical components in mechatronics

Day 3

- Basic concept of Pneumatic component and troubleshooting
- Pneumatic practice examples.
- Basic of Pneumatics Press kit and its Disassembly

Day 4

- Preparing work plan for assembling Pneumatics Press kit
- Sequential function chart, step and displacement diagram, Pneumatic connection of press kit
- Electrical connection of Press kit

Day 5

- Digital fundamentals with PLC
- PLC logic development for press kit
- Troubleshooting Tasks
- Feedback by participants
- Valedictory Function

Participants:

The STTP was attended by academicians from government engineering colleges, government polytechnic, self-financed institutes. There were total 35 participants from all over Gujarat. The list is attached as Annexure-2.

The STTP

The STTP was opened at 10:00 am with registration. The participants received there STTP kit from the registration desk. The session was opened by a small inauguration function where there were distinguished guests present at the dais. Mr. Nishith Bhatt (GM –DesignTech Systems Ltd.) was the chief guest, followed by honourable Dr. G.P Vadodaria (Patron (STTP), Principal-LDCE), Prof. G.H Upadhyay (COE Coordinator-HoD ME, LDCE), Prof. Usha Neelakantan (Convener (STTP)-HoD EC, LDCE). The inauguration function started with the remembrance of almighty God and motivational speeches by one and all present at the dais.

DAY 1

The STTP started with the lecture session by Mr. Shaheed Sharma on "Introduction to Mechatronics". This lecture gave the participants a background of Mechatronics. He discussed about the need to study mechatronics, the interdisciplinary knowledge involved and its advanced applications in automation for product manufacturing.

The second session was on the concept of system approach. In this the expert showed some videos of automated manufacturing units and discussed the processes involved in detail. He also explained about the energy, mass and information flow diagram.

The third session was the demonstration of automated pneumatic Press kit for the pick and placement of blocks.

DAY 2

The session was started with the concept of EMI (Energy, mass, and information) flow diagram. The expert explained about the importance of EMI diagram in the designing of any mechatronic system. Then he asked to perform one activity to divide the pneumatic press kit into different units and teams were made for each unit. Each team developed EMI diagram for each unit.

This session was dedicated to the study of electrical components in mechatronics. The speaker explained all the electrical components used in automation such as motor, relay, MCB, limit switch, solenoids, sensors, indicators, and reed contacts. After the lecture an assignment was given for identifying all the electrical components used in the demonstration kit.

The second days last session was dedicated to the mechanical components in mechatronics. The speaker explained all the mechanical components used in the system such as piston, screws, mounts, and pneumatic system. Then all participants were asked to identify all the mechanical components.

DAY 3

Third day was started with the session on "Basic concept of Pneumatic component and troubleshooting." In this session the experts explained the basics of pneumatic and the methods to troubleshoot.

After the lecture the participants were asked to solve pneumatic practice examples. After solving the examples the participants got conversed with the basics of pneumatics and troubleshooting of practical pneumatic problems.

The last session was on "Basic of Pneumatics Press kit and its Disassembly." The participants were asked to observe the pneumatic press kit. After understanding the kit thoroughly the participants stepwise disassembled the kit.

DAY 4

The first session on day four was on "Preparing work plan for assembling Pneumatics Press kit." Each group of participants were given press kits with manual which they had disassembled on third day. Then they were asked to make work plan for kit assembly. They were also asked to prepare sequential function chart, step and displacement diagram.

Then in after lunch session they were taught about the pneumatic connection of press kit. After the lecture the participants did the pneumatic connections.

The last session was on the "Electrical connection of Press kit." The expert explained about all the electrical connections. After the explanation all the participants practiced the electrical connections on the press kit.

DAY 5

The last day was on dedicated to the software portion of automation. The first session was on "Digital fundamentals with PLC." In this session they explained the basic PLC programming. Then the participants were given task to make different digital gates on PLC and also for automated tank filling system.

In the second session the expert explained about the PLC logic for press kit, and gave different troubleshooting tasks to the participants. After the session written feedback was given by the participants.

LAB VISIT

In addition to the lecture sessions the experts also showed different labs set up by Seimens under COE. There were total 9 labs dedicated for each process required for automation of manufacturing unit. They are as below:

- 1. Basic Mechatronics Lab
- 2. Automation Lab
- 3. Process instrumentation Lab
- 4. Electrical Lab
- 5. Rapid Prototyping Lab (3D Printing)
- 6. Product Design and Validation Lab
- 7. Advanced Manufacturing Lab
- 8. Motion and Control Machine Tools Lab
- 9. Turning and Milling Machines Lab

VALEDICTORY

Valedictory session was graced by the presence of Prof. G.H Upadhyay (COE Coordinator-HoD ME, LDCE), Prof. Y.D. Vohra (Professor-Mechanical Engineering), Prof. B.C. Khatri (Associate Professor-Mechanical Engineering). The dais was shared by the guests, Prof. M.V. Shah (Professor-EC Department), and Prof. A.B Nandurbarkar (Associate Professor-EC Department). All present at the dais shared their experiences and motivated all the participants. All participants were asked to give oral feedbacks. Overall the feedback was positive and encouraging. Certificates of participation were awarded to the participants by the honourable guests along with a Group photograph for memory.

Outcomes of STTP

The participants

- Learnt Mechatronics fundamentals and its applications in automation.
- Learnt to identify the different electrical and mechanical components used.
- Got aware with process of automated system in manufacturing unit.
- Got conversed with the PLC and PLC logic development for the pneumatic press kit.
- Got to know the process of 3D printing

Suggestions

Overall all the participants were happy with the conduction of STTP in this area, which is rarely taken up. There were few suggestions from the participants.

- Some of the participants suggested conducting more such STTPs.
- One of the participants suggested having 2 weeks training programme to cover all topics.

Acknowledgement

We are really grateful from bottom of our heart to the Commissionerate of Technical Education (CTE), Gandhinagar for giving us permission to conduct the STTP. We appreciate prompt action in giving permission to all the participants to attend training in such a short notice. We consider ourselves lucky enough to get associated with DesignTech Systems Ltd. for organizing the STTP.

We would also like to thank DesignTech Systems Ltd. for providing logistic support for the STTP in terms of certificates and registration kit. It is our immense pleasure to thank the experts for sparing their time to share critical ideas and their experiences in the area of Mechatronics. How can we forget to thank our honourable principal Dr. G.P Vadodaria for being always encouraging for such events? We appreciate all the principals and heads for allowing the participants to attend the STTP. Last but not the least we are grateful to all the participants for their discipline and enthusiasm.

INAUGURAL DESK L.D. College of Engineering ics & Communications Department Organizes

Photo Gallery







STTP GROUP

