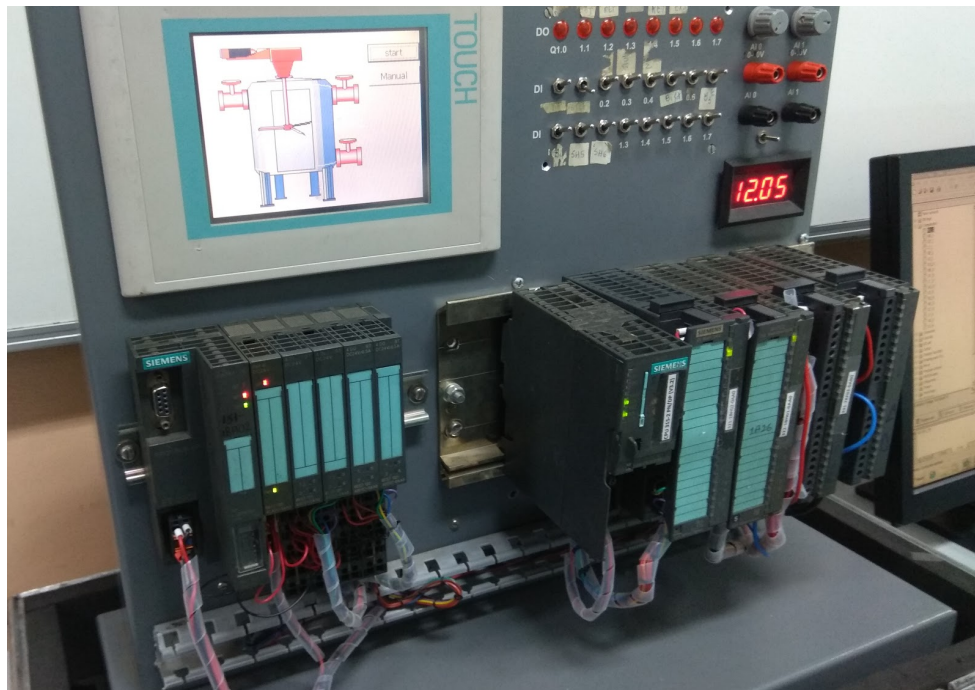# Report

on training for

Basic Automation – 1 (PLC & HMI)

BATCH-1 of 16 Girls & Batch-2 of 24 Boys

In collaboration with

Siemens ltd India. (SITRAIN)

Organized By

Centre for continuing education (CCE)
SPCE

Introduction

Two batches of Technical Value Added Courses in coordination with industry for subject "Basic Automation-1 (PLC & HMI)" were organized on 5th,6th,12th,13th and 19th october at Siemens kalwa works. The training was attended by 40 students of second year. Batch-1 of 16 girls (8 from electrical & 8 from mechanical) and Batch-2 of 24 boys (16 from electrical & 8 from mechanical) of second year. The entire training was instructed by Ms. Bhagyashree Zaware and Mr. Nikhil Arondkar (Automation Trainers at Siemens ltd.).

Objectives :

Participants will understand the working of PLC & HMI.

Participants will be able to program PLC.

Participants will be able to use PLC in engineering projects by applying the knowledge gained during the training. Which will eventually help them in their working field.
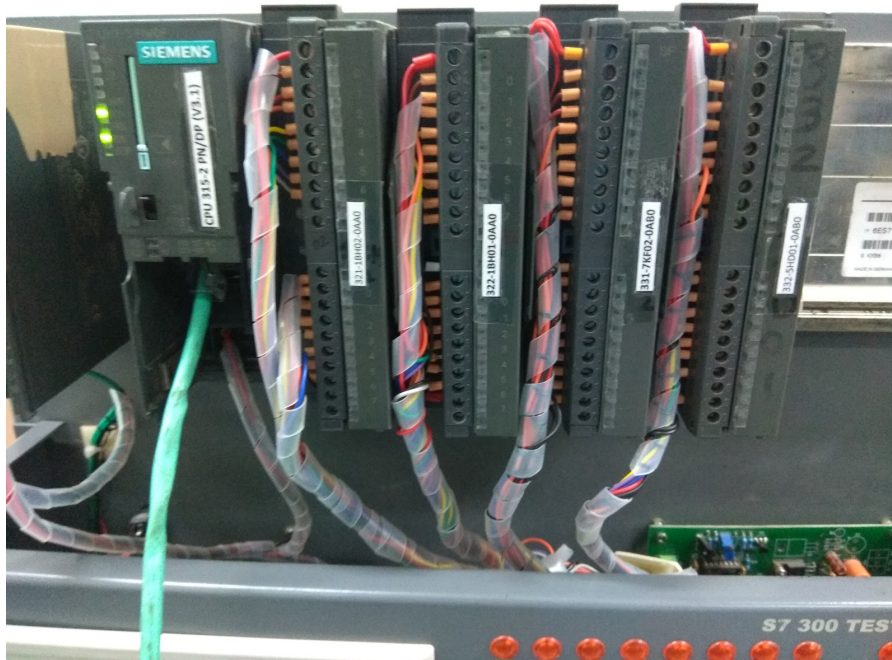
Siemens S7-300

Brief Description :

Training on Basic Automation-1 (PLC & HMI) Started with the pretest, to check the knowledge of students about the topic before training. After test, trainer gave introduction of PLC. (i.e. Complete Overview of PLC along with definition, need to replace previous complicated relay system with much simpler PLC and basic concept of PLC.) Then PLC selection criteria explained to select the hardware as per requirements from available range, such as S7-300, S7-400, S7-1200, S7-1500 and Logo. Description of available range & versions of software as per hardware is also explained.

After getting familiar with the basic idea of PLC, Training focused on the basic version of PLC hardware S7-300. Which includes detailed description of components of PLC. (Power Supply, CPU, IP/OP Signal modules, Rack-Rail, Micro Memory Card). Followed by Wiring of devices with IP/OP signal modules, Installation guidelines, powering and wiring of modules with information on addressing.

After completing hardware part, training turned towards SIMATIC Manager STEP-7 Basic V5.5x, which is appropriate software for programming of S7-300. Before starting with actual programming, Communication protocols were explained with the comparison of their specifications.

Programming part started with the introduction of programming languages used for SIMATIC Manager. (e.g. LAD, STL, FBD). LAD is the commonly used language for the programming of PLC. Then trainer gave the explanation of How to use AND logic, OR logic, AND before OR, OR before AND in the respective programming languages. To understand the use of this logics more efficiently, exercise was also given. After that, Set Reset instruction, Elementary data types, Load and Transfer operation, Symbol Table, VAT table, and Timers, Counters, Comparators was covered. To understand the use of above covered topics, trainer gave the exercises based each of the above mentioned topics. Participants practiced all those exercises and cleared all the doubts till the concepts got cleared with its applications.

On the last day of training, participants grabbed the detailed knowledge about STEP 7 Blocks including User programmable blocks (OB,FC,FB), Data blocks (shared, instance), Pre-programmed ready to use blocks in STEP-7 library (SFC,SFB). To master the STEP 7 blocks, exercises based on each block were practiced.

After mastering the Digital processing, Training session ended with the brief explanation of analog processing followed by exercises to practice the explained topics.

Conclusion

The Industrial training on Basic Automation-1 arranged at Siemens was highly successful. It was the first time, when special girls batch was formed. All the participants took an active part in all the four days of training. Participants received insight of the PLC right from its introduction to its applications in industry and day to day life. Exercises given by the trainer helped participants to absorb theoretical knowledge effectively. The whole system was explained in-depth by the trainer with detailed description of every component of hardware (Modules, cpu, profinet). Also, While performing hands on training for software, all doubts were cleared till every group successfully completes the exercise. Feedback forms shows that every participant is satisfied with the training. This kind of industrial training helped participants to improve their technical skills and they would highly appreciate more such trainings in the future.

Combine Photos of two Batches (Batch-1 of 16 Girls and Batch-2 of 24 Boys) :