Train the Trainer: Integrated Manufacturing Systems Level One Training Agenda and Learning Outcomes

Document Summary

What it does: This document is a sample, recommended agenda and learning outcomes list for a "train the trainer" course in teaching Integrated Manufacturing Systems. The course is meant to bring together specialized subject matter experts (e.g. faculty specializing in robotics, PLCs, or electronics) to understand the full impact and methodology of working with and teaching an Integrated Manufacturing System.

Who it's for: College Faculty or Integrated Manufacturing Systems trainer

M-S AMC Present and Preferred State:

PRESENT STATE → PREFERRED STATE ("New Model")

- Lecturer / Subject Matter Expert (SME)
- Learn to repair Components
- Emphasis on (memory) recall
- Learn about multiple systems . . .
  [but generally]
- Instructor dependent content
- Content is key, with generic examples
- Designed for school application
- School safety protocols
- Institution specific

- SME / Mentor / Learning Process Expert
- Learn to Troubleshoot Integrated Systems
- Emphasis on information application
- Learn about 1 system completely . . .
  [then apply concept to others]
- Instructor independent content
- Context is key, with plant schematics / prints
- Designed for school application
- Industry safety protocols ! Arc flash rules !
- Common National Standard

When: XXX

Where: XXX

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Who: XXX

Systems Integration Training Level 1:

This 3-day training session will prepare instructors to teach the Systems Integration Course. The course itself is intended to introduce new students to the technology found in today's automated integrated systems. This would enable all future technology courses to be instructed in context of plant floor systems. Additionally, the course introduces the students to a troubleshooting methodology that can be directly applied to the maintenance of equipment. These skills can and will be exercised on the AMTEC Simulator. It is assumed that the instructors attending this course will have some background in basic Fluid Power, Electrical controls and PLCs.

Agenda:

Day One: How to introduce the students to the technology. Including: PLCs, Fluid Power, and Electrical. This will include working with plant prints.

Day Two: How to teach troubleshooting to the inexperienced student. This will utilize numerous troubleshooting exercises (written) and address the methods of imprinting the troubleshooting methodology in the students. The AMTEC Simulator operation will be reviewed.

Day Three: Application of the troubleshooting methodologies on the AMTEC Simulator.

Course Objectives:

Identify, by physical examination, the sequence of operations of each station of the integrated system.
Identify the type of technology associated with each action on the integrated systems trainer. (e.g. electrical, pneumatic, etc.)
Identify each output associated with every step in the sequence of operation on each station on the integrated systems trainer.
Generate a list of most probable triggering elements associated with each step in the sequence on each station on the integrated systems trainer.
Compare the PLC inputs and outputs associated with each real world input and output with the working drawings of the integrated systems trainer.
Generate a Sequence diagram of each station on the trainer reflecting: The step, timing, output actuating, and most probable triggers causing the action.

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Given the Status of an operator's complaint, all I/O indicators (including blown fuse indicators) and the processor logic, identify a faulted part. Given a copy of the logic as it would appear on a programming terminal, and a drawing depicting the physical layout of the machine with all indicators reflecting the state of the machine and processor status indications.
Given the Status of an operator's complaint, all I/O Indicators and a sequence Diagram with outputs and triggers identified, Identify the most likely faulted Item(s). Given a drawing depicting the physical layout of the machine with all indicators reflecting the state of the machine and processor status indications.
Isolate a fault on each station as to the input that is expected/output that is expected for the paused sequence of operation.
Use the internet to supplement their understanding with unfamiliar technology as it relates to components on the SMC trainer.
Generate a flow chart (or List of actions) that reflect the troubleshooting logic used on sequencing machines.
List the part flow and process flow of the integrated systems trainer.
Match the following LANS with an example of their function: - Robot and Tooling LAN – Local I/O and Remote I/O (includes names of DeviceNet and ProfiBus) - PLC to PLC LAN - Program Back-up–and- Data Collection LAN - F.I.S. LAN (Factory Information Systems) - Work Scheduling LAN (includes Just in time, etc.)

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