

SMSCP Master Series: Teaching Automation Technology in Complex Systems

Description & Sample Agenda

This course is targeted toward SMSCP-certified teachers who wish to obtain deeper insight into the common challenges in their teaching practice connected to automation technology in complex mechatronic systems. While the course is very intensive and requires participants to deal with automation technology tools and principles on a very high level, it is first and foremost a didactic course, designed to help teachers identify and overcome a series of distinct teaching challenges covering progressively more difficult content.

Each of the teaching challenges discussed will call upon participants to examine their current teaching situation and connect it to ideas of teaching and training that are always connected to real, complex mechatronic systems that recreate or simulate industrial applications as far as possible. Among the topics discussed for each challenge will be the correct tools and methods to use, correct application of System Approach and how to close the teaching loop, and the role of technology in achieving teaching objectives.

Beginning with the challenges in introducing automation technology topics to students who may not have any background in digital fundamentals and continuing on into more difficult content, the course culminates in a deep discussion of the challenges practitioners face when teaching advanced communications topics.

Teaching Challenge 1: Introducing Automation Technology to Your Students
With the Help of a Complex System

Teaching Challenge 2: Using a Complex System to Teach Development of
Structured Control Programs

Teaching Challenge 3: Teaching Analog Value Processing in Complex Systems

Teaching Challenge 4: Pedagogy in Advanced Automation Communications

Who may register for the course: This course is only open to SMSCP-certified teachers.

What level of technical knowledge is necessary? The course is considered to be advanced from both a pedagogic as well as technical perspective, and progresses swiftly; prior knowledge of automation technology is necessary. It is not a product course in automation technology. For world-class training on Siemens automation products, please go to <http://sitrain.automation.siemens.com>.

Day 1 – Introduction & Challenge 1

- 8:00 Introduction, Ice Breaker, Welcome
- Trainers and course participants introduce themselves
 - Present the course goals, content and structure
 - Administrative topics
- 10:00 Automation Technology Overview
- Low end to high tech PLC Hardware and fields of application
 - Overview of Touch Panels as Human-Machine Interface
- 12:30 Lunch
- 13:30 Challenge 1: Introducing Automation Technology to Your Students With the Help of a Complex System
- Connection to SMSCP Level 1
 - Tools and Methods
 - Real-World Applications of Automation Technology
 - Typical Automation Hardware and Software
 - Teaching Nomenclature and Functions
 - Application of System Approach and Closing the Learning Loop
- 17:00

Day 2 – Challenges 2 and 3

- 8:00 Challenge 2: Using a Complex System to Teach Development of Structured Control Programs
- Connection to SMSCP Level 2
 - Tools and Methods
 - Real-World Applications of Structured Control Programs
 - Teaching Programming Principles
 - Programming Examples Using a Complex Mechatronic System
 - Designing Troubleshooting Exercises
 - Application of System Approach and Closing the Learning Loop
- 12:30 Lunch
- 13:30 Challenge 3: Teaching Analog Value Processing in Complex Systems
- Connection to SMSCP Level 2
 - Tools and Methods
 - Real-World Role of Analog Value Processing
 - Teaching Programming Using Functions and Blocks
 - Analog Value Examples in a Complex Mechatronic System
 - Application of System Approach and Closing the Learning Loop
- 17:00

Day 3 – Challenge 4 and Conclusion

- 8:00 Challenge 4: Pedagogy in Advanced Automation Communications
- Connection to SMSCP Levels 2 and 3
 - Tools and Methods
 - Real-World Role of Automation Communications
 - Teaching Automation Topologies and Communications using FieldBus (PROFIBUS) and Industrial Ethernet (PROFINET)
 - Teaching Concepts Related to Modern HMI Systems
 - Automation Communication Examples in a Complex Mechatronic System
 - Application of System Approach and Closing the Learning Loop
- 12:30 Lunch
- 13:30 Summary of Teaching Challenges Presented by Participants
- 14:30 Wrap up, Discussion and Feedback
- Review all topics on an example program
 - Implementation discussion
 - Course Feedback
- 17:00