Siemens S7 300/400 PLC & WinCC Flex HMI Level 1

**Software:** Simatic Manager  
**PLC Type:** Siemens S7 300 / 400 PLC  
**Duration:** 5 Days  
**Pre-requisites:** None  
**Maximum Delegates:** 8

**Brief Description**

- Be able to recognise S7 hardware and be able to replace modules when a fault occurs.  
- Be able to operate the Step 7 software to make it perform certain tasks.  
- Understand basic S7 instruction set and be able to make minor modifications to software.  
- Be able to backup and restore a PLC program when required.  
- Be able to perform basic system diagnostics when a problem occurs.  
- Understand PLC to HMI communications  
- Make alterations to HMI screens

**Course Content**

To fault find a system you need to know EXACTLY how it works

**HOW EXACTLY DOES A PLC WORK?**

- The Led on the output card means i am getting voltage out right? does it?  
- What exactly happens in between? theres more than just a program in the CPU  
- How exactly does it scan the program?  
- What is this Watchdog Timer? Is it that important?  
- Can I use the same output twice? That’s bad programming isn’t it?  
- A PLC is a logic controller, so use a logical approach to fault find it.  
- What are the 8 simple test points to check?  
- The PLC is in RUN, that means theres a program right? does it?  
- FORCING a bit and toggling a bit is pretty much the same yeah? depends on which PLC

**Then you need to know the specifics**

**HOW DO I DO THE FOLLOWING? (some straight forward some not so)**

- How do I check power is ON and PLC is in right mode (RUN or Program)  
- Check for a fault condition (is SF LED ON)  
- Establish a link to the PLC (accessible nodes)
• If comms problem check PG/PC interface
• Create a blank project and take a backup (just in case I mess up)
• Open project for PLC and go OnLine
• Interrogate Diagnostics Buffer
• Identify if it is a hardware or software fault?
• Change the battery
• Change modules if necessary, (with spares and without spares)
• Identify if it is a PLC or Comms fault (Profibus or MPI)
• Check all settings against a template, Node Address etc.
• Check Hardware Configuration
• Clear Memory and Download program
• Check software against latest copy (Compare function)
• Monitor program
• Searching for specific operands and instructions
• Changing timer, counter values On Line
• Making minor mods Off Line and On line
• Check or create a VAT table to establish parameter status
• Force a parameter if required
• Call up reference data to assist with software diagnostics
• Archive and Retrieve project
• Display Documentation (Symbols, Comments)
• Reassign an I/O address and change software addresses (Rewire Function)
• Basic Analog Input configuration
• Printing Cross Reference / Program Listings etc.
• Understanding HMI to PLC comms via MPI and Profibus
• Add Push buttons, data display and alarms to an existing HMI

Background information also covered
Understanding of the following:

• Number formats, bits, bytes, words, double words
• Binary, HEX, octal, floating point, integer
• Data types and parameter types, Bool etc.
• Block types
• Variable types (local and global)
• How to monitor various blocks
• Ladder, STL programs
• Basic Instructions, contacts, Set, reset etc.
• Timers, Counters
• Comparators, Maths
• How to make minor mods
• Altering values in a VAT table
• Back tracking through a program to establish where power flow stops
• Overall reset procedure
• Fault finding tips
Course Equipment (per delegate)

- S7 300 or 400 PLC
- WinCC HMI (shared 1 HMI per 2 delegates)
- PC or Laptop
- Real IO Simulator