Module Name (Electrical Engineering)	Total Hours
Basics Of PLC	**50**

Sr / Day	Topic Name	Contains	Hours
1	Automation Overview	Types of Automation Advantages and Disadvantages of Automation Control Strategies Types of Control Components of Automation PLC Introduction Difference between PLC and PC Advantages and Disadvantages of PLC PLC Defination Block Diagram Scan Cycle of PLC	2
	System Overview	SIMATIC S7 Overview Positioning of the Modular S7 Controllers SIMATIC S7-1200: The Modular Mini-PLC SIMATIC S7-1500: Modular Controller for the Mid to Upper Performance Range SIMATIC S7-1200/1500: Technology Functions SIMATIC S7-1200/1500: Memory Card(s) Distributed I/O Systems Additional Information SIMATIC S7-300: Modular Automation System SIMATIC S7-300: Modules	
2-3	Digital Fundamentals	Bit Byte Word Concepts Different Logic gates Circuit diagrams Truth Tables, Boolean Equations Combination Logic Circuits	4
4	Engineering Software TIA Portal	TIA Portal - Central Engineering Framework Scope of the Products STEP 7 Range of Products WinCC Range of Products Start drive Range of Products and Licensing Operating Systems for PC/PGs Parallel Installation "Side-by-Side" TIA Portal: Portal View and Project View Libraries Help Functions	2
5-6	Devices & Networks	Online Functions and Hardware Configuration Online Tools, Configuring and Para meterizing the Hardware Online Connection via Industrial Ethernet: IP Address and Subnet Mask Online Access: Accessible Devices in the Portal View CPU Memory Reset (MRES) using the Mode Selector Switch SIMATIC Card Reader Components of the "Devices & Networks" Editor Setpoint Configuration: Creating a Hardware Station Downloading the Actual Configuration into the Project (1): Inserting an Unspecified CPU Compiling the Hardware Configuration and Downloading it into the CPU CPU Properties: Ethernet Address	4
7-8	PLC Tags	Global and Local Tags Meaning of Variables and Data Types PLC Tags and Constants Details View of PLC Tags Finding / Replacing / Sorting PLC Tags Error Indication in the PLC Tag Table Copy & Paste PLC Tags to Excel Using a PLC Tag as an Operand Absolute and Symbolic Addressing Renaming / Rewiring PLC Tags Defining (Declaring) Tags while Programming Monitoring PLC Tags	4

Sr / Day	Topic Name	Contains	Hours
		Retentiveness of PLC Tags HMI Access to PLC Tags	
9-10	Program Blocks and Program Editor	Types of Program Blocks Structured Programming Process Images Cyclic Program Execution Adding a New Block Block Properties: Programming Language, Time Stamps Block Properties: IEC Check Block Properties: Know-how Protection Other Block Attributes, Editor Settings, Networks Block Programming Closing / Saving / Rejecting a Block Block Calls Compiling a Block Downloading Blocks into the CPU "Upload" Blocks "from Device" (Upload into Project)	4
11-12-13	Binary Operations	Binary Logic Operations: AND, OR Sensors and Symbols First Check, Signal State, Result of Check and Result of Logic Operation Binary Logic Operations: Exclusive - OR (XOR) Assignment, Set, Reset, NOT Flip Flops Signal - Edge Detection RLO - Edge Detection Jump Instructions JMP, JMPN, RET	6
	Digital Operations	Acquiring, Processing and Outputting Data Integer (INT, 16-Bit Integer) Data Type Double Integer (DINT, 32-Bit Integer) DataType REAL (Floating-point Number, 32 Bit) DataType Data Types and Display Formats Counters: CTU, CTD, CTUD Counter / Timer Instance Data Blocks Counter Function: Inputs Counter Function: Outputs Timer Function TON Timer Function TON (ON Delay) Pulse Diagram Basic Mathematical Functions: Addition Basic Mathematical Functions: Comparison Operations Value Assignment of a Variable Digital Logic Operations Comparator Operations: IN_RANGE, OUT_RANGE Date and Time-of-day: RD_SYS_T Hands on Practices : Various Examples	
14-15-16	Data Blocks	Data Blocks and their Usage Meaning of Variables and Data Types Overview of Data Types in STEP 7 Elementary Data Types in STEP 7 Data Types for Timers, Date and Time-of-day Complex Data Types Creating a Global Data Block DB Attributes: "Optimized Block Access" and "Only Store in Load Memory" Editing, Saving, Monitoring a Data Block Default, Start and Monitoring Values Retentiveness, Download DB into the CPU / Upload from the CPU Downloading Changed Data Blocks into the CPU Hands on Practices : Various Examples	6
17	Functions and Function Blocks	Local and Global Variables Management of the Local Data Stack The Use of Local, Temporary Variables Parameter-assignable Blocks: Example: Fault Evaluation Solution with a Parameter-assignable Block Declaring Formal Parameters	2

Sr / Day	Topic Name	Contains	Hours
		Editing a Parameter-assignable Block Calling a Parameter-assignable Block Instantiating FBs FB – Declaration Part Generating Instance Data Blocks Updating a Block Call Hands on Practices : Various Examples	
18-19-20	Organization Blocks	Types of Program Blocks Organization Blocks of the S7-1200 Creating a New OB OB Start Information using OB100 as an Example S7-1200 Startup Interrupting the Cyclic Program Time-of-Day Interrupt (OB 10) Cyclic Interrupt (OB35) Phase Offset for Cyclic Interrupts Hardware Interrupt (OB 40) Hands on Practices : Various Examples	6
21-22-23	Connecting an HMI Device	Data exchange between Touchpanel and CPU Adapting the S7 Program Adding an HMI Device WinCC Configuration Interface Buttons and Input/Output Fields Configuring the IP Address of a Touchpanel Networking a Touchpanel Configuring an HMI Connection Setting the IP address on the Touchpanel Loading the HMI Project into the Touchpanel Hands on Practices : Various Examples	6
24-25	Troubleshooting	Categories of Errors STEP 7 – Test Functions, Overview System Diagnostics - Overview Hardware, Online & Diagnostics Call Hierarchy Monitoring Tags Enable Peripheral Outputs Force Tags (Variables) Reference Data: Cross Reference of PLC Tags	4
		Total	50