

REQUIRED SKILLS AND KNOWLEDGE – UEENEEE104A		
KS01-EI150A	Programmable Controllers	<i>5050 Trainer NOT HTML YET</i>
Topic and Description	NIDA Lesson	CARD #
<ul style="list-style-type: none"> • T1. PLC Introduction encompassing: • Evolution of the programmable controller and applications • Relay control, static logic control and programmable control • Programmable controller block diagram (Inputs and Outputs) • Programmable controller advantages • Programmable controller symbols • Programmable controller functions • Numbering systems start-up procedures • Programming inputs and outputs • Operation of programmable controller inputs • PLC operation: scan cycle • Basic programming 	<p>N101 -INTRODUCTION TO PLCs</p> <ul style="list-style-type: none"> * Recognize a basic PLC block diagram. * Identify the basic PLC functions. * Identify PLC principles of operation. * Recognize and understand a simple ladder logic diagram. * Recognize the symbols used in a basic ladder logic diagram. * Use the PLC trainer to control LEDs. * Use the PLC trainer to control the motor. * Understand how the PLC's operation changes by changing the ladder logic program. 	5050-1
	<p>N105 - PLC TRAINER FAMILIARIZATION</p> <ul style="list-style-type: none"> * Identify the power requirements for the Nida Model 5050 PLC Trainer. * Recognize trainer controls, switches, and indicating devices. * Identify an experiment card. * Describe insertion and removal procedures. * Perform procedures to start an experiment. * Insert and remove an experiment card. * Perform procedures to end an experiment. 	5050-1
	<p>N102 - PLC HARDWARE</p> <ul style="list-style-type: none"> * Understand the functions of I/O modules. * Identify the different types of I/O modules. * Know the basic operation of both discrete and analog I/O modules. * Know the function of the processor module's microprocessor (CPU). * Describe a memory map and the different memory modules. * Know the purpose of the communications circuitry. * Understand the scan cycle. * Use an analog I/O module for analog input and output devices. * Use an analog I/O module for an analog input device with a relay * Observe the processor modules operation using the scan cycle. 	PC CARD 73
	<p>N103 - PLC PROGRAMMING</p> <ul style="list-style-type: none"> * Understand the arrangement of input instruction for AND and OR 	5050-1

N203 - TIMER AND COUNTER INSTRUCTIONS

- * Understand the concepts of timer instructions.
- * Describe the operation of timer instructions.
- * Understand the concepts of counter instructions.
- * Describe the operation of counter instructions.
- * Demonstrate the usage of timer and counter instructions.

N204 - I/O AND INTERRUPT INSTRUCTIONS

- * Understand the concepts of I/O instructions.
- * Describe the operation of I/O instructions.
- * Understand the concepts of Interrupt instructions.
- * Describe the operation of Interrupt instructions.
- * Demonstrate the usage of I/O instructions.

N205 - COMPARISON INSTRUCTIONS

- * Understand the concepts of comparison instructions.
- * Describe the operation of comparison instructions.
- * Demonstrate the usage of comparison instructions.

N206 - MATH INSTRUCTIONS

- * Understand the concepts of math instructions.
- * Describe the operation of math instructions.
- * Demonstrate the usage of math instructions.

N207 - MOVE AND LOGICAL INSTRUCTIONS

- * Understand the concepts of move instructions.
- * Describe the operation of move instructions.
- * Understand the concepts of logical instructions.
- * Describe the operation of logical instructions.
- * Demonstrate the usage of move and logical instructions.

N208 - FILE INSTRUCTIONS..

- * Understand the concepts of the File instructions.
- * Describe the operation of File instructions.
- * Demonstrate the usage of File instructions.

N209 - BIT SHIFT, FIFO AND LIFO INSTRUCTIONS

- * Understand the concepts of the Bit Shift, FIFO and LIFO instructions.
- * Describe the operation of the Bit Shift, FIFO and LIFO instructions.
- * Demonstrate the usage of Bit Shift instructions.

N210 - SEQUENCER INSTRUCTIONS

- * Understand the concepts of the Sequencer Instructions.
- * Describe the operation of the Sequencer Instructions.
- * Demonstrate the usage of Sequencer Instructions.

	<p>N211 - CONTROL INSTRUCTIONS</p> <ul style="list-style-type: none"> * Understand the concepts of the Control Instructions. * Describe the operation of the Control Instructions. * Demonstrate the usage of Control Instructions. <p>N301 - TRAFFIC LIGHT CONTROL SCENARIO</p> <ul style="list-style-type: none"> * Develop ladder logic programs to satisfy the needs of the traffic light control scenario. * Demonstrate knowledge of programming the PLC. <p>N302 - ELEVATOR CONTROL SCENARIO</p> <ul style="list-style-type: none"> * Develop ladder logic programs to satisfy the needs of the elevator control scenario. * Demonstrate knowledge of programming the PLC. <p>N303 - SECURITY CONTROL SCENARIO</p> <ul style="list-style-type: none"> * Develop ladder logic programs to satisfy the needs of the security system scenario. * Demonstrate knowledge of programming the PLC. <p>N304 - AMUSEMENT RIDE SCENARIO</p> <ul style="list-style-type: none"> * Develop ladder logic programs to satisfy the needs of the amusement ride scenario. * Demonstrate knowledge of programming the PLC. <p>N305 - POWER MANAGEMENT SYSTEM SCENARIO</p> <ul style="list-style-type: none"> * Develop ladder logic programs to satisfy the needs of the power management system scenario. * Demonstrate knowledge of programming the PLC. <p>.</p>	<p>5050-1, 5050-3</p> <p>5050-1, 5050-4</p> <p>5050-5</p> <p>5050-1, 5050-6</p> <p>5050-7</p> <p>PC CARD 75</p>
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<ul style="list-style-type: none"> • T2. Types of PC programs encompassing: • Ladder diagrams • Basic Programming • Program modification • Ladder diagram development • Connecting the programmable controller. 	<p>N103 - PLC PROGRAMMING</p> <ul style="list-style-type: none"> * Understand the arrangement of input instruction for AND and OR operations. * Identify different input instruction. * Identify different output instructions. * Use a four step process to develop an organized programming strategy. * Identify the correct ladder logic program for a specified process. * Understand the basic operation of counter instructions. * Use the sequencer instruction to display the contents of a data file. * Observe an application of the sequencer instruction. 	<p>5050-1</p>
<ul style="list-style-type: none"> • T3. Programming Timers encompassing: • Purpose of timers • Timer instructions • On-delay timer instruction • Off-delay timer instruction • Programming timers • Retentive and non-retentive timers • Cascading timers • The self-resetting timer • Monitoring timers • Circuit conversion 	<p>N203 - TIMER AND COUNTER INSTRUCTIONS</p> <ul style="list-style-type: none"> * Understand the concepts of timer instructions. * Describe the operation of timer instructions. * Understand the concepts of counter instructions. * Describe the operation of counter instructions. * Demonstrate the usage of timer and counter instructions. 	
<ul style="list-style-type: none"> • T4. Programming Counters encompassing: • Counter instructions • Retentive and non-retentive counter • Programming counters • Up/down counters • Self resetting counter • Cascading counters • Circuit conversion 	<p>N203 - TIMER AND COUNTER INSTRUCTIONS</p> <ul style="list-style-type: none"> * Understand the concepts of timer instructions. * Describe the operation of timer instructions. * Understand the concepts of counter instructions. * Describe the operation of counter instructions. * Demonstrate the usage of timer and counter instructions. 	
<ul style="list-style-type: none"> • T5. Program Storage encompassing: 		

<ul style="list-style-type: none"> • PLC terms • Memory • Using the PROM pack • Printing ladder diagrams • 		
<ul style="list-style-type: none"> • T6. PLC Input and Output Modules encompassing: • Purpose of modules • PLC input modules: dry contact input modules; AC input modules, DC input modules; Analog input modules • Output modules: relay output; Triac output; transistor output; analog output modules 	<p>N204 - I/O AND INTERRUPT INSTRUCTIONS</p> <ul style="list-style-type: none"> * Understand the concepts of I/O instructions. * Describe the operation of I/O instructions. * Understand the concepts of Interrupt instructions. * Describe the operation of Interrupt instructions. * Demonstrate the usage of I/O instructions. 	
<ul style="list-style-type: none"> • T7. PLC Installation Requirements encompassing: • Installation precaution • Safety systems • AS/NZS requirements • Mounting the PLC • Installation documentation • Routing signal and power cables • Locating PLCs and I/O • Earthing Requirements 		
<ul style="list-style-type: none"> • T8. Master Control encompassing: • Master control relay • Master control relay ladder diagram • Programming master control relays 	<p>N211 - CONTROL INSTRUCTIONS</p> <ul style="list-style-type: none"> * Understand the concepts of the Control Instructions. * Describe the operation of the Control Instructions. * Demonstrate the usage of Control Instructions. 	
<ul style="list-style-type: none"> • T9. Jump Function encompassing: • Jump function • Jump function ladder diagram • Programming jump functions 	<p>N207 - MOVE AND LOGICAL INSTRUCTIONS</p> <ul style="list-style-type: none"> * Understand the concepts of move instructions. * Describe the operation of move instructions. * Understand the concepts of logical instructions. * Describe the operation of logical instructions. 	

	* Demonstrate the usage of move and logical instructions.	
<ul style="list-style-type: none"> • T10. The Shift Register encompassing: <ul style="list-style-type: none"> • Purpose of Registers • The shift register • Shift register operation • Clock input • Shift register requirements • Programming shift registers 	<p>N209 - BIT SHIFT, FIFO AND LIFO INSTRUCTIONS</p> <ul style="list-style-type: none"> * Understand the concepts of the Bit Shift, FIFO and LIFO instructions. * Describe the operation of the Bit Shift, FIFO and LIFO instructions. * Demonstrate the usage of Bit Shift instructions. <p>N210 - SEQUENCER INSTRUCTIONS</p> <ul style="list-style-type: none"> * Understand the concepts of the Sequencer Instructions. * Describe the operation of the Sequencer Instructions. * Demonstrate the usage of Sequencer Instructions. 	
<ul style="list-style-type: none"> • T11. The Step Sequencer encompassing: <ul style="list-style-type: none"> • Step Sequencers • Step sequencer operation • Clock input • Step Sequencer requirements • Programming step sequencer 	<p>N209 - BIT SHIFT, FIFO AND LIFO INSTRUCTIONS</p> <ul style="list-style-type: none"> * Understand the concepts of the Bit Shift, FIFO and LIFO instructions. * Describe the operation of the Bit Shift, FIFO and LIFO instructions. * Demonstrate the usage of Bit Shift instructions. <p>N210 - SEQUENCER INSTRUCTIONS</p> <ul style="list-style-type: none"> * Understand the concepts of the Sequencer Instructions. * Describe the operation of the Sequencer Instructions. * Demonstrate the usage of Sequencer Instructions. 	
<ul style="list-style-type: none"> • T12. PLC Diagnostics and Fault Finding encompassing: <ul style="list-style-type: none"> • PLC Fault Finding • Controller Status • I/O Faults • Program Faults 	<p>N104 - PLC TROUBLESHOOTING</p> <ul style="list-style-type: none"> * Use a four-step process to develop an organized troubleshooting strategy. * Identify areas of a PLC controlled system most and least likely to fail. * Observe and understand the normal operation of a PLC controlled system. * Recognize a faulty PLC controlled system. * Identify the possible causes of the faulty system. 	5050-1, 5050-2

Performance Tests available for this competency: