(GCCS-2) Global Common Controls Software Design Online Course (Version 6.0) LMS: 33544

Contact Information
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Recommended

RS Logix 5000 Basic Ladder Logic Programming experience

Requirements

- Desktop or laptop computer (smartphones and tablets are not supported)
- 2 GHz processor or higher
- 1 GB of RAM or higher
- 100 MB of available hard disk space (some courses may require more)
- Broadband Internet Service Provider (examples: Comcast, Wide Open West, AT&T)

Operating System

- Windows 7 or higher – Windows 10 is preferred

Web Browser:

- Google Chrome 91 or higher (latest update)
- Edge 90 or higher (latest update)

GCCS2 Applications:

- RSLogix 5000 v20.01 or Studio v24 or higher with GuardLogix
- TIA Portal Comfort HMI v11, v13 is acceptable

Needed for Exam

- Webcam
- Microphone
- Sufficient internet connection

Objectives

Upon successful completion of this course, participants will:

- Understand the purpose and benefits of the GCCS-2 standard
- Add programs and routines to the logic
- Name the two levels of tags
- Identify the importance of aliases and their use
- Utilize Tag alias
- Identify the importance of modular software design
- Become familiar with Siemens TIA Portal
- Create cell and station overviews
- Prepare files and transfer to a Siemens HMI
- Delete programs
- Program alarms and prompts.
- Add action items and groups to the scroll list
- Configure and debug DeviceNet networks and EtherNet I/O

Course Outline

This course is designed to familiarize participants with the content of the GCCS-2 software standard. GM has requirements regarding the structure and content of its PLC software logic used in its manufacturing facilities. This course will provide learners with a working knowledge of these requirements.

Core Modules:

Module	Content	Delivery Method	Time (Hours)
1 - Overview	• Scope. • Purpose and Benefits. • Audience. • Definitions. • Control Logix Environment. • Rung comment, routine/program/operand descriptions	Lecture Exercise	1 .25
2 – RS Logix Overview	• Controller Organization. • Processor and Logix file naming. • I/O module configuration. • Data types • Tags and tag scope. • Tag aliasing • Programs and routines • Navigating RS Logix • Produce/Consumer Communications	Lecture	1
3 - Naming	• Action result naming. • Panel/Field device naming • Switch and Cylinder naming • Routine naming • Module naming • Tag prefixes	Lecture	.5
4 – Programs and Interlocks	• Use of programs • Use of Interlocks	Lecture	.75
5 – HMI Screen Functions	• HMI hardwired interface. • HMI communications • Default screen colors • Common Screen Banner • Standard screens and navigation	Lecture Exercise	1 1

6 – Actions	• Action logic structure • Action logic rungs • Prompting logic	Lecture	1
7 – Diagnostics	• Diagnostics categories • Message Offsets • Program diagnostic numbers • HMI diagnostic display	Lecture Exercise	.25 .75
8 – Scroll List	• Scroll list features • Scroll list expand/contract. • Function list. • Status indicators • Scroll list logic.	Lecture Exercise	1 .5
9 – Robot Concepts	• Robot specifications. • Rules of process • Robot/Cell controller physical interface. • Process control signals. • Status and miscellaneous signals. • Fast Fault Recovery	Lecture Exercise	1 .25

Common Tasks:

Module	**Content**	**Delivery Method**	**Time (Hours)**
10 – Working with RS Logix 5000	• Device level Ethernet address assignment. • Maintenance workstation setup (laptop). • Configuring RS Linx. • Assigning IP addresses with USB cable. • Disabling BootP for devices after IP address is set. • Configure IP for robots and weld controllers. • Import/export .L5K files • Control Flash firmware upgrade tool. • Downloading to the processor. • Create a Safe Node in RSLogix • Generate a Safety Network Number • Generate a Safety Signature	Lecture Exercise	.75 1
11 – Ethernet Switch setup (Octopus)	• Switch IP address setup. • Firmware upgrade. • Hirschmann switch configuration.	Lecture Exercise	.5 .5
Module	**Content**	**Delivery Method**	**Time (Hours)**

12 – RSNetworx and Devicenet	• GCCS-1 DeviceNet limitations. • EDS files for DeviceNet. • Create RS Network *.DNT files. • Troubleshoot a DeviceNet network.	Lecture Exercise	1 1
13– Multi-Language Message Extractor	• Message extractor overview. • Rung comment structure requirements. • Define flags and usage. • Use the Message Extractor. • Translate language. • Transfer messages to the HMI.	Lecture Exercise	1 1
14 – TIA Portal and Siemens HMI Panels	• GM HMI application for the workstation. • Creating *.CSV files. • HMI terminal setup. • Import tags to TIA Portal configuration and download. • Transfer application to HMI.	Lecture Exercise	2 2
15 – HMI Multi-Language Functionality	• Configure the HMI application for multi-language. • Select languages to include in WinCC project. • Select Flags for each language. • Review final translation.	Lecture	1
16 – Starting Up a Cell	• Examine cell validation requirements • Configure and validate DeviceNet networks. • Validate safety system (EStops, guards, etc.) • Use the scroll list in manual mode. • Review the software checklist. • Replace TBD bits with appropriate logic.	Lecture	1
17 – Common Modifications to a Running Cell	• Changing/updating a tooling sequence. • Adding/removing tooling actions. • Adding routines • Removing a tooling action. • Adding/Removing a station.	Lecture Exercise	1 2
Certification	• Certification Test	Test	4

Student Certification

- Students are required to take a (4) hour certification on Canvas LMS upon completion of the class.
- Students may use the Student Manual and any documentation located in the Online course during the test.
- Certification is worth 100 points – 80 points are needed to pass exam.
- This is a pass/fail competency certification – no grade will be given.
- Student will be mailed a Certificate.

Attendance

- This is self-paced course. Participants are expected to complete the Online course within (60) days from the date they receive their logon information from Macomb Community College.

Duration

- This course consists of successfully completing video lectures, exercises, and certification on the Canvas Learning Management System in a (60) day period.
- Certification Testing will occur online upon completion of the course. Student will be proctored and have 4.0 hours to complete the certification. The exam must be completed once it is started.
- Since this is self –paced course, committed hours vary due to student's prior experience. Thus, it is critical that each participant block out enough time to contribute to his/her success.

Student Rights and Responsibilities

Student online and on-ground behavior must be in accordance with Macomb's Handbook or Rights and Responsibilities http://www.macomb.edu/NR/rdonlyres/08393098-75E2-4DA0-B534-07B76A0E6DC2/0/StudentHandbook.pdf . Academic dishonesty will not be tolerated at Macomb Community College. Dishonesty, through cheating, plagiarism or other dishonest acts defeats the purpose and disgraces the mission and quality of Macomb College.

Demonstration/Activity/Exercise

Listed below is a summary of the instructor demonstrations, lecture hands-on activities, and student exercises for the course. For instructor preparation purposes, unique equipment and software required for completing a particular item is shown in the right column.

Module	Item (student exercises are noted in bold)	Unique Equipment & Software required
Module Core 1: Overview	No Exercise or Hands-on Activity (HA).	
Module Core 2: RS Logix Overview	**Exercise 1 - Creating UDTs and Tags.**	
	Exercise 2 - Creating a tag Alias	
Module Core 3: Naming	**Exercise 1 - Changing Routine and Tag Names and the Effects on the Logic**	
Module Core 4: Programs and Interlocks	No Exercise or Hands-on Activity (HA).	
Module Core 5: HMI Screen Functions	Hard-wired interface Introduce hard-wired PBs on a HMI enclosure. (HA)	
	Individual Screens Demonstrate real world screens (HA)	
	Exercise 1 - Cell Overview Screen	
	Exercise 2 - Station Overview	
Module Core 6: Actions	No Exercise or (HA).	
Module Core 7: Diagnostics	**Exercise 1 – Programming Alarms.**	
Module Core 8: Scroll List	Scroll List Screen Demonstrate features of the Scroll List Screen and how it is affected by the logic. (HA)	

Module	Item (student exercises are noted in bold)	Unique Equipment & Software required
Module Core 8: Scroll List	Scroll List Expand/Collapse Demonstrate collapse/expanding of groups (HA) Demonstrate Station Sequence operation in Auto. (HA)	
	Exercise 1 - Add Items to the Scroll List.	
	Exercise 2 – Add Groups to the Scroll List.	
Module Core: 9: Robot Concepts	**Exercise 1 – Draw a Robot Path. – Students individually complete exercise (Exercise)**	
Module Common Task 10: Working with RSLogix	**Exercise 1 - Update Controller Firmware Using Control Flash**	G12 or G16 Training Panel [Exercise is Optional if Training Panel not available]
	Exercise 2 - Download Logic File to the Processor	G12 or G16 Training Panel [Exercise is Optional if Training Panel not available]
	Exercise 3 - Export a *.L5K file	
	Exercise 4 – Import an L5K File into RSLogix	
	Exercise 5 – Create a Safe Node in RSLogix	
	Exercise 6 – Generate a Safety Network Number	
	Exercise 7 - Generate a Safety Signature	G12 or G16 Training Panel [Exercise is Optional if Training Panel not available]

Module	Item (student exercises are noted in bold)	Unique Equipment & Software required
Module Common Task 11: Ethernet Switch Setup (Octopus)	Hirschmann Octopus Switch Introduce Hirschmann Octopus Switch. (HA)	G12 or G16 Training Panel
	Exercise 1 - Configure the Simulator's Octopus Switch	G12 or G16 Training Panel [Exercise is Optional if Training Panel not available]
Module Common Task 12: RSNetworx and DeviceNet	**Exercise 1 - Troubleshoot the Simulator's DeviceNet Network**	G12 or G16 Training Panel [Exercise is Optional if Training Panel not available]
	Exercise 2 - Configure the DeviceNet Scanlist	G12 or G16 Training Panel [Exercise is Optional if Training Panel not available]
Module Common Task 13: Multi-Language Message Extractor	**Exercise 1 - Run the Message Extractor on a PLC Program**	
	Exercise 2 – Language Translation	
Module 14: TIA Portal and Siemens HMI Panels	**Exercise 1 - Creating a GM HMI Application on the PC Workstation**	
	Exercise 2 - Creation of a *.CSV File	
	Exercise 3 - Import Tags and xml into WinCC Flexible Configuration	

Module	Item (student exercises are noted in bold)	Unique Equipment & Software required
	<u>Exercise 4</u> - Transfer the Application to the HMI	G12 or G16 Training Panel [Exercise is Optional if Training Panel not available]
Module Common Task 15: HMI Multi-Language Functionality	Configuring the HMI Application for Multi-Language in TIA Portal. Demonstrate text that needs to be translated after use of Message Extractor and Language Translator. (HA)	
Module Common Task 16: Starting Up a Cell	**<u>Exercise 1</u> - Search and Replace 'TBD' Bits in Logic.**	
Module Common Task 17: Common Modifications to a Running Cell	**<u>Exercise 1</u> – Working with tag Aliases**	
	<u>Exercise 2</u> - Adding a New Action Routine	
	<u>Exercise 3</u> - Edits After Adding a New Routine	
	<u>Exercise 4</u> - Adding a New Station	
	<u>Exercise 5</u> - Editing a New Station	
	<u>Exercise 6</u> - Deleting the AA075 Station Program	