



GCCH-1 Online Course V6.0 (Global Common Controls Hardware Design) Course (LMS #33543)

Contact Information

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Course Description

This course is designed to familiarize participants with the content of the GCCH-1 Standard. This Standard is owned by the GM Vehicle Systems' organization and states the hardware requirements for the controls architecture designed for manufacturing systems installed in GM vehicle assembly and press plants. Participants will complete several student exercises and activities throughout the course and take a certification exam.

Who Should Attend

- GM: Controls Engineers and Designers
- Suppliers: Controls Engineers and Designers
- Contractors: Controls Engineers and Designers

Note: (A student who does not have experience with controls design will find it difficult to participate in the course.)

Student Materials

All student materials are located on the Canvas LMS which contains:

- (8) Video lecture tutorials. (Note: tutorials are subdivided into smaller sub-modules for improved workflow)
- (8) PDF files consisting of content to follow along with the video lectures.
- (9) Exercises are to be completed on the Canvas Learning Management System.

Needed for Exam

- Webcam
- Microphone
- Sufficient internet connection

To run a quick system check, go to: <http://remoteproctor.com/rpinstall>.



Course Outline

- **Module 1: Overview** 1 Hour
 - Define the scope of the GCCH-1 standard.
 - Explain the purpose of benefits of GCCH-1 standard.
 - Identify the audience for GCCH-1 standard.
 - Recognize deviations that supersede the GCCH-1 standard.
 - Discuss the different Normative References used.
 - List the GCCH-1 supporting information.
 - Differentiate the terms regulation, standard, guideline, and specification.
 - Identify the content and sections of the GCCH-1 standard.
 - Locate the current version of the GCCH-1 standard.
 - Interpret Normative References to Correct Supporting Information.
 - Recognize Normative References to Equipment in the Cell.
 - Identify GCCH-1 standards within the Global SOR.
 - Exercise 1.1 Statement of Requirement

- **Module 2: Architecture** 4.5 Hours
 - Define Common Controls Architecture.
 - Identify Architecture Design Criteria (Low, Medium, and High) Automation.
 - Determine Automation Classifications for Architecture.
 - Recognize Architecture Key Elements.
 - Compare Power Architecture with different levels of controls.
 - Compare Network Architecture with different levels of controls.
 - Employ Power Architecture to a Cell Layout.
 - Employ Network Architecture to a Cell Layout.
 - Recognize Global Common Panels.
 - Interpret Global Panels used in a Cell Layout.
 - Determine PLC, PDP, and HMI Span of Control.
 - Exercise 2.1 Identify Power and Network Architecture
 - Exercise 2.9 PLC Span of Control
 - Exercise 2.10 PDP Span of Control
 - Exercise 2.11 HMI Span of Control

- **Module 3: Safety** 3.5 Hours
 - Define the scope and purpose of the safeguard measures.
 - Discuss the meaning of Control Reliable.
 - Define Safety Integrated Levels (SIL).
 - (SIL) Safety Integrity Levels.
 - Explain the Safety Categories.
 - Identify Safe PLC.
 - Identify Safe PLC and Safe I/O
 - Identify Smart Guard 600.
 - Identify Safety IP6X and Safety I/O.
 - Describe Pulse Test.
 - Determine E-Stop Span of Control.



- Define Monitored Power System (MPS)
 - Discuss (MPS) Gatebox – Features, Components and Circuitry.
 - Apply (MPS) Gate Box Procedures.
 - Discuss Safeguarding – Components and Circuitry.
 - E-Stop Span of Control (Exercise)
 - Exercise 3.1 MPS Selector Switch
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- **Module 4: Documentation and Naming** 3 Hours
 - Locate the GCCH-5 Section A User Manual.
 - Locate the GCCH-5 Section I Installation Manual.
 - Define EPLAN P8.
 - Discuss the GM Configuration for EPLAN P8.
 - Locate the GM Configuration for EPLAN P8.
 - Identify GM EPLAN Project Templates.
 - Define EPLAN P8 deliverable formats.
 - Recognize Wiring Diagram (WD) Naming Conventions.
 - Recognize Electrical Cabinet (EC) Naming Conventions.
 - Define the Proper File Naming Conventions.
 - Define File Naming and Bill of Materials (BOM).
 - Discuss Documentation and Deliverables.
 - Apply proper Naming Conventions.
 - Exercise 4.1 Naming Conventions
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- **Module 5: Drawing Packages** 3.5 Hours
 - Identify drawing levels packages.
 - Identify drawing sections formats
 - Find items in the different level (WD) drawing package.
 - Exercise 5.1 Drawing Packages
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- **Module 6: Drawing Sections** 4 Hours
 - Discuss Drawing Sections for the different application levels.
 - Define Drawing Section C.
 - Fill in missing cable labeling information in Section C for the different level (WD) drawing Packages
 - Define Drawing Section E.
 - Define Drawing Section F.
 - Define Drawing Section G.
 - Define Drawing Section X.
 - Define Drawing Section Y.
 - Exercise 6.1 Cable Labeling
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- **Module 7: Robot Drawing Packages** 1 Hour
 - Identify and locate the GRS-1 Specification.
 - Identify and locate the GRS-4 Robot Interface.
 - Identify and locate the GRS-2 Rules of Process.
 - Recognize the different robot drawing packages.



- **Module 8: Drawing Packages**
 - Define Global Hardware Generation eTools.
 - Locate Global Hardware Generation eTools.
 - Identify xRWD2eRWD.
 - Identify GeRWD
 - Recognize the purpose and benefits of GeRWD.
 - Discuss eToolDrawing.
 - Discuss eCellDrawing.
 - Identify the Hardware Generation Flowchart process.

1 Hour



Student Certification

2.5 Hours

- Students are required to take a (4) hour certification on Canvas LMS upon completion of the class.
- Students may use the GCCH-1 Student Manual and any documentation located in the GCCH-1 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.
- If student passes with 80 points or better he/she will be considered certified and will be awarded 1.6 (CEU's) Continuing Education Units, which will apply to your Macomb Community College transcript.
- Student will also be mailed a Certificate.

Attendance

- This is self-paced course. Participants are expected to complete the GCCH-1 Online course within (60) days from the date they receive their logon information from Macomb Community College.

Duration

- The *GCCH-1 Online* 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 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.



Software Requirement

Operating Systems

- Windows XP, Vista, Win 7 or higher.
- Mac OS X 10.4, 10.5, 10.6, 10.7 or higher.

Windows Browsers:

- Google Chrome version 43 or higher
- Internet Explorer version 11 or higher

Mac Browsers:

- Firefox version 3.5, 3.6, 4 or 5
- Google Chrome version 10, 11, or 12
- Safari version 5

Disable pop-up blockers when using Canvas

Recommended Software:

- Microsoft Office (Excel, Word, PowerPoint)
- Adobe Acrobat Reader

For technical issues such as a password reset, login issues, or compatibility concerns contact Macomb Online Support if you have questions or need assistance with CANVAS:

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