



Global Common Controls Hardware Design (GCCH-1) Course (online version)

(Revision 4.0.1)

Course No. GCCH8017, (CTIS: 33543)

Duration 32 hours over a 2 week period

- Students complete course material at their work or home location.
- Students take a (4) hour certification test on the last day of the course at 8:00am at MTEC's facility for those students in the Detroit area.

Otherwise, offsite proctor arrangements need to be established before attending this course.

Recommended Controls Engineer or Designer experience.

Equipment Requirements

- PC or Laptop with microphone and the following software capability.
 - Windows 7 or XP.
 - Microsoft Office 2003 or Higher Version.
 - Adobe Reader.
 - Adobe Flash Player.
 - Java 5.0 or Higher Version.
 - Internet Explorer 6.0 or Higher Version.
 - Google Chrome or Mozilla Firefox.
- High Speed Cable Internet or High Speed DSL.
Recommended speed (6Mbps or Higher)

Objectives Upon successful completion of this course, participants will be able to:

- Understand the purpose and benefits of the global standard.
- Identify architecture components.
- Utilize standard safeguarding measures.
- Know what the GM Configuration for EPLAN is and where to locate it.
- Use standard naming conventions.
- Identify drawing packages at the system, controller/cell, and tool level.
- Identify the lettered sections of a drawing.
- Identify the robot specifications for robot interface packages.
- Identify math-based tools and be able to locate them.
- Complete a hardware design project.



Week 1

- Day 1 – Monday **(4.25 Hours)**
 - GCCH-1 Live Webinar – Adobe Connect **(1.5 Hours)**
 - Discuss First Day Handout - Syllabus
 - Assign Module 1, 2, 3, & 4
 - Assignment: Video Lectures
 - Pre-Test (10 Questions) not part of grade. **(15 Minutes)**
 - Module 1: Overview **(30 Minutes)**
 - Module 2: Architecture **(2 Hours)**
 - Exercises: PLC, PDP, & HMI Span of Control

- Day 2 – Tuesday **(2 Hours)**
 - Assignment: Video Lectures
 - Module 3: Safety **(1.25 Hours)**
 - Module 4: Documentation and Naming **(45 Minutes)**

- Day 3 – Wednesday **(4 Hours)**
 - GCCH-1 Live Webinar – Adobe Connect **(1.5 Hours)**
 - Review Module 1, 2, 3, & 4
 - Discuss Exercises: PLC, PDP, & HMI Span of Control
 - Q & A
 - Assign Module 5, 6, 7, & 8
 - Assignment: Video Lectures
 - Module 5: Drawing Packages **(30 Minutes)**
 - Module 6: Drawing Sections **(2 Hours)**

- Day 4 – Thursday **(1.25 Hours)**
 - Assignment: Video Lectures
 - Module 7: Robot Packages **(30 Minutes)**
 - Module 8: Math Based Tools **(45 Minutes)**

- Day 5 – Friday **(5.5 Hours)**
 - GCCH-1 Live Webinar – Adobe Connect **(3 Hours)**
 - Review Module 5, 6, 7, & 8
 - Summarize Week 1
 - Q & A
 - Discuss Student Project
 - Assign Module 1 – Overview
 - Assign Module 2 – Preliminary Design
 - Assignments: Student Project **(2.5 Hours)**
 - Module 1 – Overview
 - Module 2 – Preliminary Design

Week 1 - Total Hours

(17 Hours)



Week 2

- Day 6 – Monday **(2 Hours)**
 - GCCH-1 Live Webinar – Adobe Connect **(2 Hours)**
 - Review Assignments: Module 1 – Overview
 - Review Assignments: Module 2 – Preliminary Design
 - Assign Module 3 – Design Unit WD's
 - Assign Module 4 – Design Controller (WD's) Wiring Diagrams

- Day 7 – Tuesday **(4 Hours)**
 - Assignments: Student Project **(4 Hours)**
 - Module 3 – Design Unit WD's
 - Module 4 – Design Controller (WD's) Wiring Diagrams

- Day 8 – Wednesday **(2.5 Hours)**
 - GCCH-1 Live Webinar – Adobe Connect **(2 Hours)**
 - Review Assignments: Module 3 – Design Unit WD's
 - Review Assignments: Module 4 – Design Controller (WD's) Wiring Diagrams

- Day 9 – Thursday **(2 Hours)**
 - Independent Study for Certification Test **(2 Hours)**

- Day 10 – Friday **(4.5 Hours)**
 - Final Q & A Session **(30 Minutes)**
 - Certification Test **(4 Hours)**

Week 2 - Total Hours (15 Hours)



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
Core Module 1: Overview	1.7.1. Location of the GCCH-1 Document (Demonstration)	Web Browser
	1.7.2 GM SupplyPower Login and Password (Demonstration)	Web Browser
Core Module 2: Architecture	Exercise 1 Identify PLC Span of Control on layout by using markers.	Exercise 1 – PLC Handout
	Exercise 2 Identify PDP Span of Control on layout by using markers.	Exercise 2 – PDP Handout
	Exercise 3 Identify HMI Span of Control on layout by using markers.	Exercise 3 – HMI Handout
	Exercise 4 Identify E-Stop Span of Control on layout by using markers.	Exercise 4 – ESTOP Handout
Core Module 3: Overview	3.11.3. Enter a Cell (Demonstration)	GM Trainers – (ECS-4009)
	3.11.4. Exit a Cell (Demonstration)	GM Trainers – (ECS-4009)
Core Module 4: Documentation and Naming	4.2.3. Location GCCH-5A (Demonstration)	Web Browser
	4.3.3. Location GCCH-5I (Demonstration)	Web Browser



Module	Item (student exercises are noted in bold)	Unique Equipment & Software required
	4.6. Location of GM Configuration for EPLAN P8 (Demonstration)	Web Browser
Core Module 8 : Global eTools	8.3.1. Location of Global eTools – GeRWD Home Page (Demonstration)	Web Browser
	8.3.2. Location of Global eTools – EPLAN Home Page (Demonstration)	Web Browser
	8.3.3. Location of Global eTools – xRWD Home Page (Demonstration)	Web Browser
Project Module 1: Overview	1.2.1. Exercise- Epsilon II Statement of Requirements (SOR). Identify requirements of an SOR.	cCRWBidPackagefor EPSILONIISORV1.1.pdf
Project Module 2: Preliminary Design	2.3.1. xRWD Exercise Determine prox switches and valves needed for unit.	AA065B1 Cell Layout MAA15847 Tool Layout.pdf MAA15843_xrwd.xls MAA15847_xrwd.xls MAA15846R_xrwd.xls
	2.4.1. Select Panels Exercise Select panels for cell.	ECS Choice List – AA065B1 Cell.xls AA065B1 ECS Cell Panels Layout.ppt
	2.5.1. Network Exercise Determine the number and layout for the DeviceNet networks.	MCP_Networks.xls AA065B1 Cell Networks Layout.ppt Reference ECS Drawing Packages Reference WDS Skid SEW Drawing Packages
	2.6.1. PDP Selection Exercise Confirm that PDP is sized correctly.	CCRW Global PDP Specification & Application Matrix Open PDP Selection.xls spreadsheet
	2.6.2. MCP Selection Exercise Select MCP.	ECS Choice List – AA065B1 Cell.xls
Project Module 3: Preliminary Design	3.3.1. Station Drawing Package Exercise Complete the station drawing.	WD-MAA15847_Prelim(2007-11-14).pdf MAA15847_Tool Layout.pdf



Module	Item (student exercises are noted in bold)	Unique Equipment & Software required
	3.4 Air Sizing Exercise Confirm the air flow of the system.	None
Project Module 4: Design Controller (WD's) Wiring Diagrams	4.2.1. Referencing ECS's & Station WD's Exercise. Determine ECS #s to be used.	WD-LD07AA065B1_Prelim(2007-11-15).pdf WDT-G06-BODY1CELL_MAIN_RevC(2007-05-10)_en.pdf
	4.3.1. Buss Drop Exercise - Section CA Determine bus drops.	WD-LD07AA065B1_Prelim(2007-11-15).pdf WDT-G06-BODY1CELL_MAIN_RevC(2007-05-10)_en.pdf
	4.3.2. 480VAC Power Distribution Exercise - Section CB Determine power distribution cables.	WD-LD07AA065B1_Prelim(2007-11-15).pdf WDT-G06-BODY1CELL_MAIN_RevC(2007-05-10)_en.pdf
	4.3.3. 24VDC Power Distribution Exercise - Section CC Determine DeviceNet layout.	WD-LD07AA065B1_Prelim(2007-11-15).pdf WDT-G06-BODY1CELL_MAIN_RevC(2007-05-10)_en.pdf
	4.3.4. DeviceNet Exercise - Section CD Determine 24VDC connections.	WD-LD07AA065B1_Prelim(2007-11-15).pdf WDT-G06-BODY1CELL_MAIN_RevC(2007-05-10)_en.pdf AA065B1 Cell & Station Device Assignments.xls AA065B1 Cell DeviceNet Layout.ppt
	4.3.5. Ethernet Exercise - Section CE Label the IP Addresses.	WD-LD07AA065B1_Prelim(2007-11-15).pdf WDT-G06-BODY1CELL_MAIN_RevC(2007-05-10)_en.pdf



Module	Item (student exercises are noted in bold)	Unique Equipment & Software required
	4.3.6. Bonding Exercise - Section CG Determine which panels are shown in the bonding interconnect.	WD-LD07AA065B1_Prelim(2007- 11-15).pdf WDT-G06- BODY1CELL_MAIN_RevC(2007- 05-10)_en.pdf
	4.3.7. Skid Crossover Exercise - Section CM Label light curtains.	WD-LD07AA065B1_Prelim(2007- 11-15).pdf WDT-G06- BODY1CELL_MAIN_RevC(2007- 05-10)_en.pdf AA065B1 Cell Skid Crossover Light Curtains.ppt
	4.3.8. 24VDC Safety Reset Motion Exercise – Section CM Complete safety reset motion 24VDC connection.	WD-LD07AA065B1_Prelim(2007- 11-15).pdf WDT-G06- BODY1CELL_MAIN_RevC(2007- 05-10)_en.pdf
	4.3.9. Controller Air Header Exercise - Section G Complete the pneumatic air feeds and hoses.	WD-LD07AA065B1_Prelim(2007- 11-15).pdf WDT-G06- BODY1CELL_MAIN_RevC(2007- 05-10)_en.pdf
	4.3.10. Controller Water Header Exercise - Section I Complete the welding hose sizes.	WD-LD07AA065B1_Prelim(2007- 11-15).pdf WDT-G06- BODY1CELL_MAIN_RevC(2007- 05-10)_en.pdf
	4.3.11. Cable Sizing Exercise Determine cable sizing.	None