MFGT 2571: Adv. PLC Programming using IEC 61131-3

A. COURSE DESCRIPTION

Credits: 5
Lecture Hours/Week: 5
Lab Hours/Week: *.*
OJT Hours/Week: *.*

Prerequisites:
This course requires both of these prerequisites
  MFGT 2550 - Programmable Logic Controls
  MFGT 2551 - Programmable Logic Controls Lab

Corequisites: None
MnTC Goals: None

This course provides learners with hands-on knowledge and understanding of advanced programmable logic control devices and systems. This course is predicated entirely upon IEC 61131-3. Prerequisite: MFGT2550 and MFGT2551 or equivalent. Co-requisite: MFGT2560 and MFGT2564.

B. COURSE EFFECTIVE DATES: 08/26/2002 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Discuss standards in PLC programming.
2. Demonstrate use of various data types and classes.
3. Implement object and file management in CoDeSys.
4. Configure hardware using the CoDeSys IDE.
5. Discuss the various programming languages in IEC 61131.
6. Implement selected programming languages in CoDeSys.
7. Demonstrate structured text.
8. Discuss the Program Organization Units of IEC 61131.
10. Use Sequential Function Chart to implement a state machine.
11. Discuss Visualization in CoDeSys
12. Implement Visualization in CoDeSys.
14. Configure selected industrial network(s) in CoDeSys.
15. Discuss motion control using CoDeSys.

D. LEARNING OUTCOMES (General)

1. The learner will gain an understanding of general IEC 61131 -3 programming principles. Focus will be on an appreciation of Object Oriented Programming and best-practice project design techniques as modeled by Good Automated Manufacturing Processes (GAMP). The Common Elements of IEC 61131-3 will be covered and the learner will gain an appreciation for data attributes. Focus will be on task-based execution control and principles of code reusability as facilitated by object oriented programming.
2. The learner will gain an understanding of code object development and the process of best-choice language selection. The learner will be introduced to the IEC 61131.3 Software Model.

3. The learner will gain an understanding of general control programming and data manipulation methods using the IEC61131-3 based CoDeSys V3 Integrated Development Environment. Particular emphasis will be placed on the learning of the Structured Text programming language.

4. The learner will gain an understanding of control sequencing; object library development and management; and software debugging tools for CoDeSys. The learner will also develop a Human Machine Interface (HMI) to visualize program execution.

5. The learner will gain an understanding of network communication using the CoDeSys IDE and execute basic motion control programming techniques using the PLCopen Motion function Blocks.

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies
   None

F. LEARNER OUTCOMES ASSESSMENT
   As noted on course syllabus

G. SPECIAL INFORMATION
   None noted